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ENTOMOLOGIST

An Illustrated Journal

OF

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EDITED BY N. D. RILEY, F.R.E.S., F.Z.S.,

WITH THE ASSISTANCE OF

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"By mutual confidence and mutual aid
Great deeds are done and great discoveries made"

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LEPIDOPTERA IN THE INNER AND OUTER HEBRIDES DURING THE YEAR 1947.

BY J. W. HESLOP HARRISON, D.SC., F.R.S.

IN 1947 we spent the months of June, July and August in continuing our botanical researches in the Inner and Outer Hebrides, where we worked the Isles of Rhum, Coll and Tiree in the former group, and the Isles of Barra, South Uist, Benbecula, Baleshare, Ronay and Grimsay in the latter. All of these islands, with the exception of Ronay and Grimsay, which lie between North Uist and Benbecula, have been investigated by us on previous occasions. Thus, in tackling Ronay and Grimsay we were breaking entirely new ground.

Naturally, in the course of our numerous botanical excursions, observations of lepidopterological interest were made. Of these some concerned insects new to Hebridean lists, or to individual islands, whilst others provide new facts and stations for rare and important species. In this paper only such observations are placed on record.

Pieris rapae L.—Seen rarely on both Tiree and Coll, almost certainly an immigrant.

P. napi, L.—Common enough on Ceann a'Mhara, Isle of Tiree.

Colias croceus Fourcroy.—On scabious flowers near Loch an Duin, Isle of Coll, August 28.

C. hyale L.—A single specimen on the east shore of Loch Cliad, Isle of Coll, on June 30.

Nymphalis io L.—Much more plentiful on the Isle of Rhum this season than *Aglais urticae*. First seen on the wing on the second week in June and, subsequently, in August. On one huge patch of nettles on the north shore of Loch Scresort no fewer than five batches containing hundreds of dead larvae were seen. These had almost certainly been sucked by bugs.

Vanessa cardui L. and *V. atalanta* L.—Both insects were of free occurrence as immigrants in the Hebrides during 1947.

Eumenis semele L.—On the machair and dunes in Tiree and Coll. Whilst this butterfly was known to be well-distributed in the west and south of Rhum, this season it was captured for the first time in the east along Loch Scresort and near Cave Bay.

Pararge aegeria L.—In the woods around Kinloch at the head of Loch Scresort, Isle of Rhum.

Maniola jurtina L.—Now placed on record for the Isles of Ronay, Grimsay and Benbecula; in all cases only the race *splendida* was represented.

Coenonympha tullia Müller.—This species occurred quite commonly in Kinloch Glen, Rhum, as well as in the Isle of Coll. In Tiree, it was rare and local. Whilst it was widespread on Coll, it was exceptionally abundant near Loch a'Mhill Aird, where quite a high percentage of the specimens bore much heavier eyespots than those proper to var. *scotica*. In one *Molinia* slack in that area it battled freely with its congener *C. pamphilus* L.

Polyommatus icarus Rott.—Noted on all the islands in the form of race *clara* Tutt; now recorded for the first time from the Isles of Ronay and Benbecula. A magnificent female of a very rich deep blue colour was netted in the Kinloch Woods, Isle of Rhum.

Callophrys rubi L.—Larvae swept from heather on Rhum and Coll.

Laothoë populi L.—Imagines taken on Rhum and ova, as well as larvae, from aspen on Coll.

Macroglossum stellatarum L.—Immigrants plentiful on Coll, Tiree and Rhum in June.

Hemaris tityus L.—Not rare on rhododendrons on Rhum, but also seen on the moorlands at flowers of bird's foot trefoil and lousewort. A specimen, noted at rhododendron at 5.30 p.m. (G.M.T.), when disturbed rose very high above the trees and flew to the moor some distance away.

Notodonta ziczac L.—Larvae on very low *Salix arenaria*, Isle of Rhum.

N. dromedarius L.—Larvae on hazel, a very unusual food-plant, and on birch, Samhnan Insir, Isle of Rhum.

Lophopteryx capucina L.—Rare on Coll but common in all stages round the head of Loch Scresort, Rhum.

Tethea or Fb.—Common on aspen on Rhum, but really rare on Coll. In the Outer Isles it was noted for the first time in the Isles of Benbecula and Ronay. In the latter island larvae swarmed on the aspens spread-eagled on the cliffs. In Benbecula it was not uncommon on aspens overhanging the sea lochs near Lidestrome.

T. duplaris L.—Larvae common on birch, Isle of Rhum. A fine melanic female was taken on June 19 at Kinloch.

Macrothylacia rubi L.—Now reported for the first time from the Isle of Ronay.

Saturnia pavonia L.—Now added to the lists for the Isles of Tiree and Benbecula.

Drepana lacertinaria L.—Larvae beaten from birch, Kinloch, Isle of Rhum.

Spilosoma lutea Hufn.—On the south shore of Loch Dun Mhurchaidh, Isle of Benbecula—a considerable extension of the Outer Hebridean range of the insect.

Eilema lurideola Zk.—A single larva, which I failed to rear, was taken amongst rocks along Loch Cliad, Isle of Coll; it *probably* belonged to the present species.

Apatele rumicis L.—Larvae on bramble, Isle of Ronay; these were racially separable from Durham larvae.

Agrotis vestigialis Rott.—On the machair at Balevanish, Isle of Benbecula.

A. ipsilon Rott.—A single specimen at rest on a window, Kinloch Castle, Isle of Rhum, on June 12; possibly an immigrant.

Diataraxia oleracea L.—Larvae in abundance on Benbecula, near Loch Hermidale, August 25.

Triphaena pronuba L.—On ragwort heads, Uachdar, Isle of Benbecula.

Ceramica pisi L.—Found freely as larvae on heather and other moorland plants, Isle of Ronay.

Hadena bombycina Hufn.—On the slopes of Barkeval, Isle of Rhum.

H. cucubali Fuessly.—Taken at Kinloch, Isle of Rhum, on June 18; larvae on the Isles of South Uist and Benbecula in August.

Bombycia viminalis Fab.—Now recorded as much more widely spread on Rhum than was recognized formerly. Larvae on *Salix atrocinerea* in Glen Shellesder and on *S. aurita* near Cave Bay and Kinloch.

Hyppa rectilinea Esp.—A species now recorded for the first time from the Hebrides; taken at Kinloch, Isle of Rhum, on June 14.

Antitype chi L.—Larvae on mixed herbage, Druim Fishaig cliffs, Isle of Coll, provide the first record for the island; imago taken on Rhum, August 15.

Phlogophora meticulosa L.—Larvae on various plants, *Salix aurita*, etc., along Loch Cliad, Isle of Coll.

Apamea monoglypha Hufn.—Common on ragwort, Uachdar, Isle of Benbecula, range of variation great, with black forms common.

Celaena haworthii Curt.—Captured in the north end of the Isle of Ronay in the form of var. *erupta* Frey, August 20.

Procus furuncula Hb.—In the form of var. *rufuncula* Haworth along Loch an Duin, Isle of Coll; new to the island.

Hydraecia lucens Frey.—Very plentiful on ragwort amongst the sand hills in the south of the Isle of Baleshare.

H. micacea Esp.—Of free occurrence on ragwort, Uachdar, Isle of Benbecula.

Caradrina clavipalpis Scop.—Very common in the Gramisdale area, Isle of Benbecula.

Orthosia stabilis View.—A single larva on black poplar near Balephuil, Isle of Tiree; first record from the island.

Agrochola lota Cl.—Larvae on *Salix aurita* on the Isles of Rhum and Coll.

Eupsilia transversa Hufn.—Larvae beaten from birch on Rhum, and imagines bred in September.

Xylocampa areola Esp.—Larvae very abundant on honeysuckle in the Isles of Rhum and Coll. The insect is widely distributed on both islands, and occurs in isolated gorges and on cliffs. In fact, it presents every appearance of a Pleistocene relict form.

Abrostola tripartita Hufn.—Larvae beaten from nettles on the Isle of Grimsay.

Hipparchus papilionaria L.—At light in the mixed birch woods on the south side of Loch Scresort, Isle of Rhum, August 11.

Scopula ternata Schr.—In Kinloch Glen, and on the broken ground, under the cliffs, Rudha na Roinne, Isle of Rhum.

Nothopteryx carpinata Bkh.—Larvae beaten from birch, Kinloch, Isle of Rhum.

Lygris testata L.—Common on the Isles of Benbecula, Ronay and Grimsay. On Rhum the larvae were beaten from hazel, rose and mountain ash in great numbers; these are novel plants in my experience. Larvae were also obtained from hazel in the Isle of Coll.

Dysstroma truncata Hufn.—A very dark green form was captured in Kinloch Glen, Isle of Rhum.

D. citrata L.—On nearly every rock face on the Isle of Ronay.

Chloroclysta miata L.—Beaten from rose, birch, etc., along the shores of the central lochs and on cliffs, Isle of Coll.

Thera cognata Thunb.—The larvae of this species occurred in enormous numbers on the dwarf juniper, *Juniperus sibirica*, on Coll in late June and early July. The insects bred displayed a wide range of variation.

Xanthorhoë fluctuata L.—Netted from ragwort in August on the Isle of Benbecula.

Epirrhoë alternata Müll.—Darkish forms occurred around Vaul Bay, Tiree, in June.

Colostygia didymata L.—Not rare on the Isle of Grimsay.

Entephria caesiata Schiff.—This species, so unexpectedly rare in the Hebrides, was taken on August 5, at about 1700 ft. on Barkeval, Isle of Rhum.

E. flavocinctata Hb.—Now reported from the Isle of Rhum for the first time; it occurred amongst *Saxifraga hypnoides* on August 5 at an elevation of 1500 ft. on the mountains Fionchra and Minishal. As the food-plant grows on Canna and Eigg, it is almost certain that planned search for entomogeographical reasons would reveal its presence on those two islands.

Euphyia bilineata L.—As var. *atlantica* on Benbecula, Ronay and Grimsay. A very beautiful dark orange specimen was noted at Harris, Isle of Rhum, on June 16.

Earophila badiata Hb.—Larvae occurred in great numbers on *Rosa spinosissima* in Kinloch Glen, Isle of Rhum, in June.

Perizoma alchemillata L.—During this season the larvae of the present species have been exceptionally common on hempnettle on the Isles of Rhum, Coll, Benbecula, Grimsay and Baleshare; in all cases the insect is now recorded for the first time from the island concerned.

P. albulata Schiff.—Common and variable on the Isles of Coll and Tiree.

P. blandiata Hb.—On Coll and Tiree in June and on Rhum in August; these facts suggest that the species is bivoltine in the Hebrides.

Operophtera fagata Scharf.—Large numbers of larvae were beaten from birch at Kinloch, in Rhum, in June; from them are now being bred types, var. *fasciata* Petersen and a unicolorous, dark purple form.

O. brumata L.—In the second week in June larvae were beaten in enormous numbers from birch; without exception these produced the race *myricaria* Cooke. This form is also attached to birch in Prestwick Carr, Northumberland.

Eupithecia centaureata Schiff. Larvae found on *Senecio aquatica*, Kinloch, Isle of Rhum.

E. pulchellata Steph.—Larvae abundant on flowers and seeds of foxglove, Isle of Ronay.

E. lariciata Frr.—Very sparingly as larvae, Kinloch Woods, Isle of Rhum.

E. nanata Hb.—Larvae on heather, Isles of Benbecula and Ronay.

Ellopia fasciaria Schiff.—Larvae beaten from Scots Fir, Kinloch, Isle of Rhum.

Selenia lunaria Schiff.—Captured at rest on a window on Kinloch Castle, Rhum, on June 12; larvae beaten from birch in Kinloch Woods in August.

Erannis aurantiaria Esp.—Larvae plentiful on many trees and also beaten from heather in Kinloch Glen, Isle of Rhum.

Nyssia zonaria Schiff.—Larvae in countless numbers on the sand dunes, Balephuil, Vaul Bay, Gott Bay, Isle of Tiree; Machair Mhor, Hogh Bay, Isle of Coll; Kilmory, Isle of Rhum. On Coll, where the larvae favoured bird's foot trefoil, they were attached to isolated, and often very small, patches of the food-plant in the sand dunes. After stripping these, they were attacking the only other plant available—the common thistle. On Rhum, in one case, 31 fully grown larvae were noted on a square foot of *Lotus*.

Dyscia fagaria Thunb.—On heather, Loch a'Mhill Aird district, Isle of Coll.

Zygaena filipendulae L.—Very common on the Isle of Bàrra, especially between Castlebay and Borve. The insects were visiting the flowers of *Orchis Fuchsii* var. *hebridensis*.

Hepialus fusconebulosa Goeze.—Captured at rest on the shores of Loch Cliad and in the Druim Fishaig area, Isle of Coll.

NEPTICULA DECENTELLA and LITHOCOLLETIS GENICULELLA IN CHESHIRE.—On June 9, 1947, I took on the trunk of a sycamore in a small fox-covert at Frandley, near Great Budworth, Cheshire, a moth which Mr. W. H. T. Tams of the British Museum has kindly identified as *Nepticula decentella* H.-S. (*Stigmella decentella* H.-S. in Kloet and Hincks' *Check List*, 1945). I learn from the *Entomologist* of February, 1933, that this species was first taken in Britain by Mr. R. Adkin in August, 1931, at Eastbourne. I should be glad of information as to its present known status in this country. In the same wood, also on sycamore trunks, I found in July, 1945, several examples of *Lithocolletis geniculella* Rag., which were identified by Mr. A. E. Wright. I am told that this species has also been found elsewhere in Cheshire. Has it been taken in other northern counties? Both feed on the abundant sycamore. These insects are now in Mr. Wright's collection.—A. W. BOYD; Frandley House, near Northwich, Cheshire.

THE GREENWOOD COLLECTION.—It is worth putting on record that last year Mrs. E. E. Bentall very kindly presented the Greenwood Collection of British Lepidoptera, acquired by her husband about 1911, to the Dept. of Entomology of the British Museum (Natural History). This collection was made by Alfred Greenwood in Essex and elsewhere a little over one hundred years ago (1842–1846). The majority of the specimens are in excellent condition and they are contained in a twenty-six-drawer mahogany cabinet. The Rev. G. H. Raynor gave a very complete account of this collection in his list published in the *Entomologist's Record* (1912, **24**, 290–293; 1913, **25**, 8–12, 71–77) entitled "An Old Essex Collection."—T. G. HOWARTH B.E.M., F.R.E.S.; Brit. Mus. (Nat. Hist.), Cromwell Road, S.W. 7.

COENAGRION ARMATUM (CHARPENTIER), A DRAGON-FLY RE-DISCOVERED IN ENGLAND.

BY CYNTHIA LONGFIELD.

FROM the evening of May 23 to the 29, 1947, I spent the Whitsun holiday at Stalham, Norfolk (V.C.27). I had prospected the ground late the previous season, as I had decided to make a determined effort to find *Coenagrion armatum* again, which had eluded all other seekers since 1919. The weather was perfect and the date was suitable according to the previous records, dating from 1903. I had ruled out Hickling and all ground on that side of the Stalham-Yarmouth main road, because of the disastrous sea-water flooding of 1938. I chose an area close to the River Ant, as being the most suitable habitat for the species, and went directly there on May 24. At the end of three hours slow and careful quartering of the ground (it was hot in the reeds and the water was quite deep), I came upon my first pair of *armatum*, flying a few inches above the surface, attached *per collum*. At first sight they resembled *Ischnura elegans* (Van der Linden), owing to the generally black dorsal colours and the bright green of the 8th segment and the whole undersides of the insects, but a closer look showed green dorsally on the 1st and 2nd segments. I soon saw more of them, males predominating, and these showed quite conspicuously the long lower anal appendages which are a pruinose cobalt-blue in colour and enormous for the size of the damsel-fly. The females were very like the males, but fawn-yellow beneath rather than green and with nearly half the 8th segment black dorsally. On the other hand, the large hump on the centre prothoracic lobe has a green " boss " in the females, while it is all black in the males. The post-ocular spots in the females are very much larger than in the males and are blue in both sexes. There were a few other touches of blue on both sexes, but the prevailing light colour was a very brilliant green, most unlike our usual British *Coenagrion* species. Mr. George T. Porritt remarked (1910, *E.M.M.*, **46** (21) : 161) on how green the average specimens remained throughout. The blue form is said to be the most prevalent on the Continent. De Selys describes the males (1850, *Rev. Odon.* : 193) as having 4 small blue dots on the dorsum of the thorax, and in one of the four males I captured there were these 4 blue dots, in another male only 2 dots, while in the other two males taken, and in all the others that I could closely examine while they rested, the dorsal surface of the thorax was entirely black.

It is an interesting fact that the commonest *Coenagrion* in those parts is *pulchellum* (Van der Linden), with a common form of the male having the blue thoracic ante-humeral stripes reduced to 4 tiny blue dots. Porritt remarked that the flight of *armatum* was rather swift and that it kept near the banks, but I only found either sex amongst the reeds and bulrushes, or over small pools filled with the White Water-lily (*Nymphaea alba* L.). They flew very slowly with a "dancing" motion, only going a short distance before settling, either very low down on a stem, or on the lily leaves. They probably oviposit in the latter, so beloved by the genus, but I did not see the process taking place. I visited them on four different days and the behaviour was the same each time. There were none to be found on the adjacent pools filled with the Bog-bean (*Menyanthes trifoliata* L.), in the open grass area, although the water was of the same depth. Females were scarce, I only saw about nine, while I estimated the males at roughly four dozen. I took 2 males and 1 female for the British Museum (Natural History) and the same number for myself.

APLASTA ONONARIA IN SUSSEX.—While I was collecting in Tilgate Forest on the night of August 23 in the company of two other members of the S. London Ent. Soc. a small Geometer came to light which was new to us, but which has now been identified as a male of *Aplasta ononaria*. It seems unlikely that this was a stray wanderer from the Folkestone colony, and since there is plenty of its food-plant near the site of its capture it is possible that the insect has established itself in mid-Sussex.—E. H. WILD; 19, Birdhurst Road, S. Croydon, Surrey.

MARGARODES UNIONALIS AT LEIGH-ON-SEA.—Mr. Dennis Smith recently asked me to check up a few micros of his taken locally, and amongst these was a beautiful male specimen of *Margarodes unionalis*. He informed me that it came to the light in his bathroom at Leigh-on-Sea on the night of August 28, 1947. The moth is in absolutely fresh condition; the transparent wings in this state look peculiarly beautiful, a fifty-year-old specimen in my possession having a much more opaque appearance. I was particularly struck by the enormous size of the tail tuft. Mr. Smith most generously made me a present of the insect. He told me that his attention was first attracted to it by the attitude in which it settled, with the fore wings nearly at right angles to the thorax. I do not think *unionalis* has previously been recorded for Essex. As elsewhere, this season has been a remarkable one for immigrants. On September 19 I took a very large and perfect *Laphygma exigua* near here; five minutes later a *Vanessa atalanta* came to the car head-lights.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

PAPERS ON MALAYSIAN RHOPALOCERA. III: THE BUTTERFLIES OF SINGAPORE ISLAND.

By A. Steven Corbet,
British Museum (Natural History).

During the Japanese occupation of Malaya, Mr. F. C. van Ingen was a prisoner of war on Singapore Island, and from May, 1944, to his release in September, 1945, he collected and bred Lepidoptera. As a result of this rather intensive work some interesting information has been obtained, and several species have been bred in Malaya for the first time. The short bred series of *Pratapa deudorix* (Hewitson) thus obtained shows that this species is represented in Malaya by a subspecies distinct from the Burmese form.

Mr. van Ingen's collection consists mainly of butterflies, of which there are 244 specimens representing 93 species and with an unusually high proportion (105 specimens) of females. One of the most surprising omissions from the collection is the Satyrid *Elymnias hypermnestra* (L.), which is quite common on the Island, where it is represented by the distinct subspecies *agina* Fruhstorfer.

To date, 373 species of Rhopalocera have been recorded from Singapore Island, but of these, 61 have not been taken during the past 30 years.

The species of especial interest obtained by Mr. van Ingen are listed below.

Chilasa clytia clytia (L.).—♂♀, both bred, of form *dissimilis* (L.), which form alone occurs on Singapore Island. These specimens appear to be indistinguishable from typical *dissimilis* from Canton. Both this form and form *onpape* (Moore) occur in Kedawi, but otherwise, *C. clytia* is absent from Malaya proper, Sumatra, Borneo and Java, although the *dissimilis* form occurs in some of the more easterly of the Lesser Sunda Islands.

Graphium sarpedon luctatius (Fruhstorfer).—♂♀. The female of this very common butterfly is very rarely taken by collectors, and I obtained none during five years' collecting in Malaya.

Pieris canidia malayica Martin.—♂. This species was first reported from Singapore by Martin in 1909 (*Ent. Z.*, **23**: 161), who found local specimens in the Raffles Museum. The species has never been found on the Malayan mainland, and it was suggested that the Singapore colony originated from individuals reaching the Island from Hong Kong. Although the Singapore specimens are nearest to typical *canidia* from Hong Kong, it is noteworthy that they differ in that the female has the black spot in space 1b on the fore wing smaller and distinctly double.

Appias libythea olferna Swinhoe.—4 ♂, 4 ♀. First observed in Singapore in 1922 (Moulton, 1923, *J. Malay. Br. R. asiat. Soc.*, **87**: 234), since when it has become increasingly common. Curiously enough this species and *Chilasa clytia* and *Pieris canidia*, which have become established on Singapore Island since the publication of Distant's *Rhopalocera Malayana* in 1888, but are absent from Malaya proper, have much the same distribution in the Oriental Region, as is shown in Table I.

TABLE I.—*Distribution of Certain Singapore Species of Butterflies which are not otherwise Found in Malaysia.*

	Ceylon.	India and Burma.	Siam.	South China.	Hainan.	Malaysia (except Singapore).	Luzon	
Chilasa clytia (L.)	×	×	×	×	×	—	×	Also found in Mindanao and some of the Lesser Sunda Islands.
Pieris canidia (L.)	—	×	×	×	×	—	×	—
Appias libythea (F.)	×	×	×	—	×	—	×	—

Malaysia is considered to comprise Malaya proper, Sumatra, Borneo and Java.

Eurema brigitta senna (C. & R. Felder).—2 ♂, bred. The Felders' type-specimen of *senna* was obtained by le Comte de Castelnau (French consul in Singapore) from "Malacca Interior." Actually, the specimen may have been obtained from the neighbouring state of Johore, whence it is known that Castelnau obtained insects. Although *E. brigitta* is not uncommon in the highlands of Sumatra, there are no records (other than that of the Felders) of its having been taken on the Malayan mainland, and, in fact, it was thought that its only stronghold in Malaya was on Penang Hill, where I found it not uncommonly in 1932.

The discovery of the species in Singapore is of considerable interest, and it may be mentioned that Messrs. A. B. Cross and A. W. Sleep (who were also prisoners of war on Singapore Island) caught a specimen in 1944.

The absence of *E. brigitta*, as well as of *Papilio paris*, *Argynnis hyperbius* and *Acraea issoria* (Hübner) (= *vesta* (Fabricius)) from Malaya proper, all of which are common on the Sumatran hills, may appear surprising, but it may be that the explanation lies in the fact that, until quite recently, there was no established secondary plant association on the Malayan hills. The distribution of the above-mentioned species is given in Table II.

TABLE II.—*Distribution of Certain Oriental Species of Butterflies which are Absent from the Malayan Mainland and Borneo.*

	Ceylon.	India and Burma.	South China.	Malayan mainland.	Sumatra (hills).	Borneo	Java.	
Papilio paris L.	—	×	×	—	×	—	×	—
Eurema brigitta (Cr.)	×	×	×	—	×	—	×	Extends to Papua, Australia and Africa.
Argynnis hyperbius (L.)	×	×	×	—	×	—	×	Extends to Papua, Australia and Abyssinia.
Acraea issoria (Hbn.) (= *vesta* (F.))	—	×	×	—	×	—	×	—

Precis hedonia ida (Cramer).—♂. As far as Malaya is concerned, this species is confined to Singapore Island and south Johore, and in the latter locality only has the butterfly a footing on the Asiatic mainland.

Hypolimnas bolina bolina (L.).—3 ♀. Two of the females are indistinguishable from the common Javanese form *iphigenia* (Cramer), while the third has the orange brown colour on the fore wing restricted to a small patch in the outer area and the white discal area on the hind wing replaced by a dark-dusted orange discal patch.

All the Malayan specimens of *H. bolina* taken in the last century are referable to the Burmese subspecies *incommoda* Butler. There are no records of the species having been taken in Malaya during the first 35 years or so of the present century, but, during the past ten or twelve years, the Javanese subspecies *bolina* (L.) has been found in the southern half of the Peninsula.

Eulaceüra osteria kumana Fruhstorfer.—2 ♂, ♀. This butterfly continues to be as common on Singapore Island as anywhere in the Peninsula.

Polyura hebe plautus (Fruhstorfer).—2 ♂, 2 ♀. One of the very few Malayan butterflies in which the Singapore representative is racially distinct from that found on the Malayan mainland. The subspecies *plautus* differs very distinctly from *chersonesus* (Fruhstorfer), from Malaya, and *hebe* (Butler), from Sumatra, in the broader and more uniform black border on the fore-wing termen, and in the presence of a broad black border on the upperside of the hind wing. In the latter respect it is nearer the subspecies *ganymedes* (Staudinger), from Borneo, than to any other race.

Allotinus unicolor unicolor C. & R. Felder.—4 ♂, 3 ♀. The type specimen of this species was obtained in Singapore by Wallace.

Logania marmorata damis Fruhstorfer.—♂, ♀. Fruhstorfer's type of *damis* (a male) also came from Singapore.

Arhopala ariel antis Corbet.—♀. *A. antis* is very rare in Malaya, and the present specimen represents the most southerly record for the species. *A. antis* is closely allied to *A. ammon* (Hewitson) and *A. ammonides* (Doherty), and the male genitalia appear to be identical in all three species. There can be no doubt that they represent distinct species, however, for the males are easily separable. In both sexes of *A. ammonides chunsu* Fruhstorfer, from Malaya, the upperside is rather pale blue, with a slight silvery sheen, and a broad black border on both wings ; *A. ariel antis* has similar black bordering in both sexes, but the upperside is a dull purple blue, while in the bluish purple *A. ammon* the male has a very narrow black border on both wings.

The other *Arhopala* species obtained by Mr. van Ingen were *A. zambra zambra* Swinhoe ♀, *A. kounga ridleyi* Corbet ♂, *A. centaurus nakula* (C. & R. Felder) ♂, *A. aurea* (Hewitson) ♂, *A. eumolphus maxwelli* (Distant) 4 ♀, *A. antimuta antimuta* C. & R. Felder ♂, and *A. anniella anniella* (Hewitson), 3 ♀.

Pratapa deva relata (Distant).—2 ♂, ♀.

Pratapa icetoides calculis H. H. Druce.—♀.

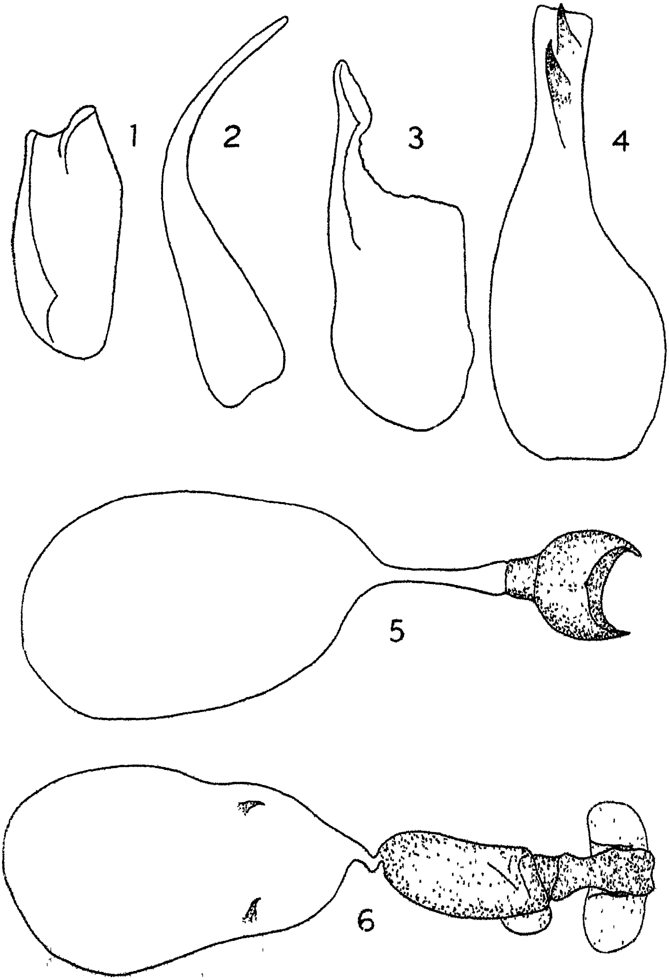
Pratapa cippus maxentius (Fruhstorfer).—5 ♂, 2 ♀. It appears to be impossible to maintain a separation between the species usually placed in the genera *Pratapa* Moore and *Tajuria* Moore, except on the basis of the male secondary sexual characters.

Pratapa deudorix ingeni subsp. nov.—3 ♂, 2 ♀. On account of the rarity of *P. deudorix* in Malaya and Sumatra, it has been difficult to discover in what respects this species differs from the closely allied *P. mantra* (C. & R. Felder) in these countries. The two species fly together from Burma and Siam through Malaysia to the Philippines and Celebes, but *P. deudorix* is absent from Java.

On the upperside *P. deudorix* is royal blue in the male and purple blue in the female, the latter sex with a faint greenish tinge to the wing bases in Borneo. In *P. mantra* the male is shining green, and the female is rather pale blue with a distinct greenish tinge. *P. mantra* has the apices of both wings, in both sexes, rather more extensively blackened, and the inner margin of the hind wing is more strongly whitened in *P. deudorix*. The genitalia show specific differences in both sexes (Figs. 1–6).

The Malayan representative of *P. deudorix* constitutes a subspecies distinct from those found in Burma or Borneo.

♂. *Upperside* duller and more purple than in subsp. *oeta* (de Nicéville), from south Burma, or subsp. *cyrus* (H. H. Druce), from



FIGS. 1–6.—(1) Valva and (2) aedeagus of (1) *Pratapa mantra* (C. & R. Feld.); (3) and (4) the same of *Pratapa deudorix* (Hew.). Ostium bursae and bursa copulatrix of (5) *Pratapa mantra* (C. & R. Feld.); (6) *Pratapa deudorix* (Hew.).

North Borneo; the black area on the fore wing more extensive than in *oeta*, and extending almost to the base of space 2. Fore wing 16 mm.

♀. *Upperside* duller and more purple than in neighbouring races, and the fore-wing apex more broadly blackened. The black submarginal spots in spaces 1b, 2 and 3 on the hind wing are quite conspicuous, whereas they are usually obsolete in *oeta* and *cyrus*. Fore wing 17 mm.

In both sexes the *underside* is as in *cyrus*, but usually the orange tornal area on the hind wing is not as extensive.

SINGAPORE. 3 ♂, 2 ♀, including the ♂ holotype (B.M. Rhop. Type No. 15083) and the ♀ allotype (B.M. Rhop. Type No. 15084), v.1944–ix.1945 (*F. C. van Ingen*). Also in the British Museum: ♀, Penang, 1895 (*Lakatt and Pamboo*), *ex* Coll. Oberthür (larger and paler on both surfaces); ♂, East Coast of Sumatra, Bila, 1917–1919 (*F. Arnold-Wallinger*).

The type-specimens were bred from larvae which were described as light brownish green and developing a green band before pupation; pupa green, brown.

Rapala domitia domitia (Hewitson).—♂. Other *Rapala* species taken were *R. pheretima sequeira* (Distant), 6 ♂, 6 ♀, *R. iarbus iarbus* (Fabricius), 3 ♂, 2 ♀, and *R. manea chozeba* (Hewitson), 4 ♂.

Bibasis harisa consobrina (Plötz).—♂.

Erionota thrax thrax (L.).—2 ♂, ♀, bred.

Erionota torus Evans.—♀.

Polytremis lubricans lubricans (Herrich-Schäffer).—♀. Brigadier W. H. Evans has found this to be the oldest name for the common species hitherto known as *P. contigua* (Mabille).

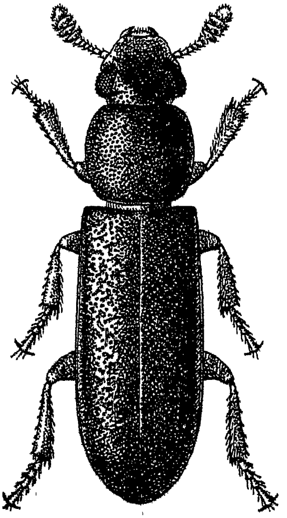
Caltoris malaya (Evans).—♀, bred.

DESTRUCTION OF BUTTERFLIES BY HORNETS.—During the hot August of 1947 the Buddleias surpassed themselves as centres of attraction for butterflies. Hordes of Tortoiseshells, closely run in numbers by Peacocks, the three Common Whites, a few *Argynnis paphia* (including one perfect *valesina*), some Meadow Browns, and, occasionally Red Admirals, Painted Ladies and Clouded Yellows made up the throng. An increasing number of detached wings under the trees claimed one's attention, and were soon seen to be due to the patrolling of the trees by hornets, who were taking both butterflies and hive bees. On seizing an insect the hornet retreated into other foliage and then stripped off wings, abdomen, legs and head—in that order—and then flew off with the bare thorax. In the case of the hive bees the abdomen was severed and dropped, but with the butterflies the abdomen was eaten off. The great majority of the wings were those of tortoiseshells, but the three Whites were also represented, and in a few cases those of *paphia* were noticed. So far as could be seen no Peacocks were ever taken; possibly their size and black appearance were a little forbidding. One Clouded Yellow was seen taken from *Sedum*.—G. M. RUSSELL; Minstead, New Forest, September 16, 1947.

ON TWO SPECIES OF *LYPHIA* INTRODUCED WITH STORED PRODUCTS INTO BRITAIN (COLEOPTERA, TENEBRIONIDAE).

By H. E. Hinton, Ph.D.,
Department of Entomology, British Museum (Natural History).

In recent years two species of *Lyphia*, *L. orientalis* Blair from the Oriental Region and *L. depressa*, sp. n., from West Africa, have been introduced on several occasions into Britain in stored products. There is no evidence to suggest that either species has established itself here or is likely to do so. The species of *Lyphia* are found associated with wood-boring beetles, chiefly Bostrichidae and Lyctidae, and there is little doubt that they feed on the larvae and pupae of these beetles. In addition to describing the two species mentioned above, the opportunity is now taken of describing a new African species not found in stored products.



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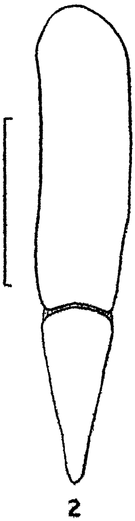

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Fig. 1.—*Lyphia depressa* Hinton, sp. n.
Fig. 2.—Dorsal view of male genitalia of *Lyphia orientalis* Blair.

Lyphia depressa, sp. n. (Fig. 1).

Female.—Length, 3·19–3·77 mm.; breadth, 0·90–1·04 mm. Body subparallel-sided and feebly convex with disk of pronotum and elytra distinctly flattened. Cuticle moderately strongly shining and dark rufo-piceous with eyes black and antennal club and tarsi brownish testaceous. *Head* with greatest breadth across eyes nearly twice as great as narrowest part of head between eyes (27 : 14); punctures round, about two-thirds as coarse as facets of eyes, and separated by slightly less than one to one or, more rarely, two diameters; surface between punctures with sparse microscopic punctures. Clypeus with anterior margin shallowly, arcuately emarginate for its entire breadth; surface sculptured like head, but on extreme anterior sides with punctures much denser. Eye with narrowest part, where divided by side of front, as broad as eight or nine facets; eyes separated beneath head by slightly more than the greatest diameter of the ventral part of an eye (10 : 8). *Pronotum* with broadest point, which is at about apical two-fifths, broader than long (0·96 : 0·85 mm.) and base broader than apex (0·77 : 0·69 mm.). Anterior margin feebly, arcuately emarginate at middle. Sides evenly narrowed from apical two-fifths to base, nowhere distinctly sinuate. Disk sculptured like head; extreme side with punctures seldom separated by as much as one diameter, but hardly noticeably coarser than those of middle of disk. *Elytra* indistinctly striate, with punctures of intervals of most specimens so mixed with strial punctures that the latter are not very evident; on disk punctures of striae and intervals equal in size, and about as coarse as those of extreme sides of pronotum; punctures of intervals and striae very irregularly distributed, being confluent to separated by about four diameters; surface between punctures with widely spaced, fine, oblique or transverse rugae and with only an occasional microscopic puncture. *Abdomen* with a deep, narrow, marginal line on fifth sternite which is nearly complete to base in some specimens and confined to sides in others.

Male.—Unknown.

Type.—♀, in the British Museum (Nat. Hist.). Manchester, in ship on cocoa beans from West Africa, iv.1947 (*M. D. Stevens*).

Paratypes.—1, W. Africa: Ivory Coast, Bouroukrou, 1907 (*A. Chevalier*); 1, Liverpool, on ship from W. Africa, v.1946 (*M. T. Stewart*); and 1, Liverpool, on palm leaf matting from W. Africa associated with *Dinoderus bifoveolatus* Woll., *Tribolium castaneum* (Herbst), and *Laemophloeus minutus* Oliv., v.1947 (*D. E. Andrew*).

Comparative notes.—Its small size and distinctly depressed body will serve to distinguish it from all other African species.

Lyphia orientalis Blair (Fig. 2).

1930. *Lyphia orientalis* Blair, *Indian Forest Rec.*, **14** (5): 18.

Male.—Length, 4·0–4·7 mm.; breadth, 1·12–1·28 mm. Body narrow, strongly convex, subcylindrical. Cuticle moderately shining and pale to moderately dark reddish brown with eyes black and antennal club brownish testaceous. *Head*, with greatest breadth across eyes slightly more than twice the minimum breadth of the head between the eyes (32 : 15); punctures round, about two-thirds as coarse as facets of eyes, and usually regularly separated by about half their diameters, but in some specimens some punctures are contiguous or even confluent; surface between punctures with a scarcely noticeable (mag. × 75) reticulate microsculpture. Clypeus with anterior margin truncate or scarcely noticeably emarginate; surface with punctures finer than those of head, and usually separated by one to two diameters except on extreme sides, where they are much denser. Eye with narrowest part, where divided by side of front, as broad as 6–7 facets; eyes separated beneath head by slightly more than the transverse or greatest diameter of the ventral part of an eye (12 : 10). *Pronotum* with broadest point, which is on apical half, usually not quite as broad as long (1·12 : 1·15 mm.) and base broader than apex (1·07 : 0·85 mm.). Anterior margin not distinctly emarginate at middle. Sides arcuate, nowhere distinctly sinuate. Disk with a narrow, median longitudinal impunctate line; punctures round to broadly oval, hardly coarser than those of head. and usually separated by less than one to one or a little more than one diameter; sides with punctures very little denser and not distinctly coarser; surface between punctures smooth or with a scarcely noticeable (mag. × 75) reticulate microsculpture, with very few or no microscopic punctures. *Elytra* feebly striate, the strial punctures in most specimens being easily distinguishable from those of intervals, which are round, as coarse or nearly as coarse as those of pronotal disk, as large as strial punctures, and usually separated on disk by one to three diameters, but often by less; surface between punctures with a few sparse irregular rugae and with a scarcely noticeably impressed reticulate microsculpture. Abdomen with marginal line of fifth sternite distinct only at sides. *Legs* with front tibiae abruptly dilated in apical two-thirds.

Female.—Externally similar to male, but with front tibiae evenly broadened to apex and without numerous long, testaceous hairs on basal half of ventral side of front femora.

Distribution.—India, Ceylon, Siam, Borneo, introduced into Britain, but not established.

Comparative notes.—From *L. depressa* this species may be distinguished as follows: (1) Body subcylindrical, not depressed; (2) anterior margin of clypeus truncate or nearly so instead of distinctly emarginate; (3) surface between coarse punctures of head without numerous microscopic punctures; and (4) size larger, 4·0–4·7 mm. long instead of 3·1–3·7 mm. long. From *L. tetraphylla* (Fairm., 1856), to which it bears a very close resemblance, it may be distinguished by having the punctures of the head and sides of the pronotum distinctly finer than the facets of the eyes and rarely contiguous or confluent. In *L. orientalis* the narrowest part of the eye, where divided by the side of the front, is as broad as 6–7 facets, whereas in *L. tetraphylla* it is only as broad as 4–5 facets.

L. orientalis has been introduced into Britain in sorted products on a number of occasions, but is not yet established here. My records are as follows: Numerous adults, larvae, and pupae in bamboo with *Dinoderus*, Lyctids and *Tribolium castaneum* (Herbst), Glasgow, vii.1944 (*J. A. Downes*); 1, Glasgow, in bamboo on ship from Calcutta, x.1944 (*C. R. Hancock*); 1, Manchester, in bamboo dunnage in ship, vi.1946 (*J. D. Norris*); and 1, Liverpool, in bamboo on ship from Burma, vii.1947 (*K. G. Smith*).

This species has been found in India in wood attacked by *Dinoderus bifoveolatus* Woll. and *Xylopsocus* sp. (Beeson, 1941, *The Ecology and Control of the Forest Insects of India and the Neighbouring Countries*; Dehra Dun), and there can be little doubt that it attacks larvae and pupae of *Dinoderus* and other wood-boring insects. *Lyphia tetraphylla* (Fairm.) is known to feed on larvae of *Sinoxylon sexdentatum* Oliv. in Europe.

Lyphia carinicollis, sp. n.

Female.—Length, 3·7–4·1 mm.; breadth, 0·87–0·98 mm. Body narrowly subcylindrical. Cuticle moderately feebly shining and very dark reddish brown to black with antennae and legs distinctly paler reddish brown. *Head* with greatest breadth across eyes nearly twice narrowest point between eyes (28 : 15); margins above eyes very feebly ridged; punctures on head between eyes round or nearly so, about two-thirds as coarse as facets of eyes, and mostly separated by less than their diameters; surface between punctures smooth or nearly so. Clypeus with anterior margin truncate, and surface slightly more finely punctate than head. Eye with narrowest part, where divided by side of front, as broad as 4–4½ facets; eyes separated beneath head by half again the transverse or greatest diameter of the ventral part of an eye (12 : 8). *Pronotum* at broadest point, which is near apex, distinctly narrower than long (0·82 : 0·96 mm.) and base broader than apex. Anterior margin truncate at middle. Sides only feebly arcuate, evenly narrowed to base. Disk with a very narrow, scarcely noticeable, median impunctate line; punctures approximately as coarse as those of head, and separated usually by half of one to one diameter; sides with punctures very slightly denser and coarser; surface between punctures with a scarcely noticeable, reticulate microsculpture. *Elytra* with intervals 2 to 5 finely but distinctly and sharply keeled on apical fifth or seventh and first (sutural) margined on apical fifth; intervals elsewhere flat. Disk with strial punctures as coarse as those of pronotal disk and no larger than those of intervals, with which they sometimes appear to be mixed; punctures of discal intervals separated by one to three diameters, and surface between them microscopically reticulate like pronotum and with a number of fine and oblique, transverse, or irregular rugae; sutural interval, except on base and apex, with punctures distinctly finer than those of other discal intervals. Epipleura with a shallow, curved groove for the reception of the lateral expansion of the basal part of the fifth abdominal sternite. *Abdomen* without a marginal line on fifth sternite, but with a very broad and conspicuous gibbosity on each side near base and with apical margin slightly but distinctly swollen.

Male.—Unknown.

Type.—♀, in the British Museum (Nat. Hist.). Africa: Mashonaland, Salisbury, xii.1900 (*G. A. K. Marshall*).

Paratype.—♀, Africa: Mozambique; Caia, 27.vi.1910, in bark (*H. Swale*).

Comparative notes.—In many features this is the most unusual member of the genus. From all known African and Indian species it may be distinguished by having the prothorax considerably narrower than long, the breadth/length ratio being 0·85. Furthermore, no other African or Indian species has the apical elytral intervals distinctly carinate, or the large gibbosity on either side of the fifth abdominal sternite.

NOTES AND OBSERVATIONS.

Rhodometra sacraria in Hertfordshire.—Whilst collecting in a clover field near Tring on August 16 I disturbed and netted a specimen of *R. sacraria.* It is a male and in fine condition. Dr. Cockayne, to whom I showed the specimen alive, thinks the capture so far inland worth recording.—A. L. Goodson; The Zoological Museum, Tring, Hertfordshire.

Tinaea Assembling.—One of my breeding-cages contains an accidentally enclosed virgin female of the Clothes Moth, *Tinaea pellionella.* The males have beeen swarming round the cage, which is standing on an outside window-ledge, for the past few days. Tonight I counted eleven, and on previous nights there have been many more. I have not previously observed the males of these small moths assembling.—A. Granville White; Hill Top House, Chaldon, Surrey.

Colias croceus: Proportion of ab. pallida.—A normal female of *Colias croceus* taken on July 29 last at Shoreham deposited a few ova and from these 12 butterflies were raised, 5 males and 7 females. Of the latter, 3 were ab. *pallida.* The larval stage from hatching of the egg to pupation occupied 22 days for most of them and all the insects were unusually large.—J. Tetley; Horley, Surrey, September, 1947.

COLIAS CROCEUS ♀ F. HELICE.—The following experience suggests that some of the reports of the abundance of *Colias croceus* ♀ f. *helice*, when the insects have not been netted or examined at close quarters, may not have been correct. In mid-August I went to the South Coast and, on arriving in the evening, was told that many *helice* were about. Next day, on the ground indicated, I saw hundreds of male *Colias croceus*, but only one female (typical), apart from a few wrecks. I saw several greenish-white insects which at a short distance might well have passed for *helice*, but every one that I netted proved to be a very worn and faded normal *croceus*, as often as not a male.—F. H. LYON; Great Bradley, Withypool, Minehead, Somerset.

LATE SURVIVAL OF COLIAS CROCEUS.—During the night of 20/21 October, 1947, some 10° F. of frost were registered in the Camberley district and the press proclaimed it as the coldest October night since 1935. The 21st itself was sunny, and I took the opportunity of visiting several fields where *C. croceus* had been in evidence earlier in the month. I was surprised to find their numbers, never very great in this district, unaffected by the drop in temperature of the previous night. I counted fifteen of both sexes on the wing, flying vigorously in the autumn sunshine. On Saturday, October 25, I was at Bath and noticed that here, also, *C. croceus* was still about. I counted 12 specimens either in my father's garden or in a rough field adjoining it. Again both sexes were represented, but this time included one var. *helice* in their numbers. The majority of the butterflies appeared quite fresh.—Lt.-Col. C. G. LIPSCOMB; Paxton, London Road, Camberley, Surrey.

[Other late records of *C. croceus* and *C. hyale* include the following: *C. croceus* in Oxford on November 8 (A. M. Emmett); Nov. 9 at Minchinhampton (C. G. M. de Worms); Nov. 10 at Bridgewater (J. Cowley); Nov. 3 at Tiverton (W. H. Dowdeswell); and Wells, Nov. 13, drying its wings (A. Valentine). The latest record of *hyale* seems to be November 6 at Pevensey, where it was seen by A. E. Moon. The original notes of correspondents from which these observations have been extracted have been forwarded, together with a number of others, to Capt. Dannreuther for summary in connection with his migration records.—ED.]

A MIXED PAIRING: COLIAS HYALE × COLIAS CROCEUS AB. PALLIDA.—On September 6, while we were collecting on a lucerne field at Sheldwich, near Faversham, Kent, my wife took what she believed to be a pair of *Colias hyale* in copulation. She had some difficulty in capturing them, as they were flying strongly; she did not observe which insect was active in flying. I was very surprised to find on examination that the female partner was *Colias croceus* ab. *pallida*. This mixed pairing is the more surprising as *Colias croceus* was abundant on the field and *Colias hyale* in some numbers, including at least one fresh female. The copulating insects were both very fresh, so that they can hardly have paired in desperation for lack of their own species. It appears, in fact, that this combination is attractive to the insects. A little later in the day, on the same field, I was pursuing a male *Colias hyale* when it became more than a little interested in another insect, which again proved to be *Colias croceus* ab. *pallida.* I regretted not having available a breeding cage where I could attempt to obtain ova from the *pallida*; but perhaps this experience will inspire someone who has the necessary equipment to attempt to breed from such a mixed pair. It seems that the reverse combination is not attractive. While collecting near home in August I observed a male *Colias croceus* fly up to a female *Colias hyale,* and turn away without showing the least interest. In fact I blamed the male at the time for mistaking a potential partner for a member of the Pierinae, since I then believed the female to be *Colias croceus* ab. *pallida,* and only later discovered its true identity !—M. J. GODDARD; East Ilsley, Newbury, Berks.

COLIAS CROCEUS "DRUMMING."—I caught a *Colias croceus* ♀ f. *helice,* at Wombwell, on Sunday, October 12, along with an ordinary male. It is not the primrose coloured one, but a white one. I disturbed the pair in a dried-up pond, and both took to the air, flying around each other. I gave them up as lost and continued my journey. Arriving back at the same place later I saw the pair again. The male was drumming away at the antennae of the female with its front legs. In addition I caught two other males and two females of the ordinary form. The butterfly is rare in this district.—JOSHUA HUDSON; 69, Milton Street, Wombwell, nr. Barnsley.

NYMPHALIS ANTIOPA IN HANTS.—A Camberwell Beauty (*N. antiopa*) was brought to me in good condition on October 25, which had been caught the previous day hibernating in a wooden post underneath some straw which was lying against an old shed.—Sir MURDOCH MCLEOD; Culverton House, Lymington, Hants.

NYMPHALIS ANTIOPA IN DORSET.—When shopping in Shaftesbury, Dorset, on September 6, 1947, I saw, flying down the main street, among traffic, a large Camberwell Beauty (*N. antiopa*). The wing borders were yellow, and the butterfly, as far as I could judge, in good condition. It was a day of hot sunshine with an easterly breeze.—VERE TEMPLE; King's Chase, Tollard Royal, Salisbury.

RARE ABERRATION OF VANESSA CARDUI IN EAST TYRONE.—This noted migrant was more abundant than usual during the month of August in this district, and on the 31st I took among scabious an aberration very similar to that depicted in South's *British Butterflies*, pl. 49, fig. 4; this illustration, however, does not show the white marginal spots on the hind wings which appear in the original figure (*Entom.*, **13**: 72). In my insect, which is a male, there is, on the upper side, a blue-centered white spot at the anal angle of the hind wings.—THOMAS GREER; Sandholes, Cookstown, Co. Tyrone.

SECOND BROOD LIMENITIS CAMILLA.—On May 11 an unusually advanced larva was found in a Buckinghamshire wood, brought home and placed on growing honeysuckle. For 72 hours it remained motionless and then moulted. A period of intense feeding followed until on the 23rd it "has gone all broody," as my diary put it at the time. On May 25—Whit Sunday—I was astounded to find it had pupated. A very large male imago emerged on June 4. The short time in pupa and the early emergence appear noteworthy.

On September 6, walking along a ride in Pignal Enclosure of the New Forest, my attention was attracted by a fresh and very dark *Pararge aegeria* flying 10 yards inside the wood over bracken. By the time I had reached the spot it had disappeared. Gently waving my net to put it up again I was astonished to disturb a newly emerged male *camilla*, which I was able to take. It is of average size and normal in all respects. According to Frohawk the recorded number of second emergences is very small. It is a strange coincidence that I should have happened to find a larva in so advanced a state so early and also to have had the luck of getting one of a second emergence, and that in a different part of the country. The two incidents clearly have some bearing upon each other, all the more interesting because of the severity of the 1946–47 winter and the prolonged heat of the summer. My wife and I spent some time in the vicinity of my recent catch on the 6th without seeing another specimen. The weather broke on the morning of the 7th and we returned to London.—R. M. HANDFIELD-JONES; 149, Harley Street, W. 1.

LIMENITIS CAMILLA (L.) SPREADING IN LINCOLNSHIRE.—The White Admiral was first seen in Lincolnshire in 1941. The locality was the woodlands five miles south-west of Lincoln, where the species had been recorded regularly in the 1880–90's. From 1941 to 1945 it gradually increased in numbers, and by 1945 could be described as well established. In 1947 the species has appeared in woodlands five miles south-east and seven miles to the north-east of Lincoln; both localities are on the north side of the River Witham. Only odd specimens have been noted, but the woodlands are ideal for an increase. This is the most northerly present limit for the species reported in this country. The species is being closely watched in Lincolnshire, and records of its further spread elsewhere will be welcome.—F. T. BAKER, F.R.E.S.; City of Lincoln Museum, August 19, 1947.

DISTRIBUTION OF BRITISH BUTTERFLIES.—Mr. J. E. H. Blackie's article in the *Entomologist* of November, 1947, on the frequency and distribution of the commoner British butterflies must have been read with interest by many lepidopterists and collectors. Many of us are aware of the misstatements and exaggerations in published accounts about butterfly distribution, and, as Mr. Blackie remarks, "when learned and careful writers are inaccurate" one must approach generalizations about the commoner species with very considerable scepticism. Only recently I read a note on *Coenonympha tullia*, written in 1947, which stated that this butterfly is common in marshy and low-lying places in the counties of England north of Lincolnshire. It need hardly be added that this is a gross exaggeration, and that the species concerned is extremely local in the area mentioned, and entirely absent from many localities where it was found formerly.

Both South and Stokoe indicate that the headquarters of *Apatura iris* is in the counties of Northants and Lincs. This, of course, is far from the truth to-day, and can hardly, at any time, have been correct. *Apatura iris* may be found sparingly in the region indicated, but is far less frequent there than in certain parts of southern England. Again, Ford (1944, *Butterflies*) gives the impression that *Argynnis cydippe* is more frequent than *Argynnis aglaia* in South Yorks, though this is by no means true. I know of only one authentic instance of *Argynnis cydippe* in South Yorks, a single male caught in 1917; *Argynnis aglaia*, on the other hand, though not abundant in this locality, enjoys a wide distribution and is reasonably common in one or two places. I am alive to the many difficulties facing an author who refers to the general distribution of butterflies, including, of course, many areas of which he could not possibly have personal knowledge, but it should never be forgotten that many formerly productive localities have changed for the worse in recent years through urbanization and other influences. That is why so many of the old records are obsolete, and, unless carefully checked, should not be quoted as applicable to-day.—George E. Hyde, F.R.E.S.; 20, Woodhouse Road, Doncaster.

Papilio Machaon in Dorset.—On August 7, when I was near Cerne Abbas, Dorset, I saw a specimen of *P. machaon* which I think was probably subspecies *gorganus*. I was unable to capture it.—C. R. B. Baker; Fields House, Lancing College, Sussex.

Nymphalis polychloros in Kent.—On August 17, 1947, a female specimen of the Large Tortoiseshell, the first I had seen for many years, not only visited my garden, but entered a sitting-room, settled on a curtain and obligingly opened its wings. Other visitors to my garden this year include *Argynnis paphia, Vanessa cardui* and *Macroglossum stellatarum*.—B. W. Adkin; Highfield, Pembury, Kent.

Daphnis nerii near Manchester.—A specimen of this Hawk Moth, slightly worn, was picked up by two young boys in a potato field on Chat Moss, near Manchester, early in September this year (the exact date is not certain) and is now in my collection.—K. C. Greenwood; 1, Conyers Avenue, Birkdale, Southport, Lancs.

RECENT LITERATURE.

Butterfly Lives. By S. Beaufoy. Preface by E. B. Ford, F.R.S. London: Collins. 4to. Pp. 128. 12*s*. 6*d*.

Mr. Beaufoy is already known to a wide circle of entomologists as the photographer responsible for many of the photographs in E. B. Ford's *Butterflies* in the *New Naturalist* Series. The present volume contains nearly a hundred photographs depicting the stages in the life-history of twenty-two species of British butterflies. Considerable care has been exercised in the selection of these insects, so that a representative collection from all the families has been made. The photographs, which are mostly enlarged, are of considerable scientific value and show a high degree of artistic skill; they are uniformly excellent throughout the book. Each series of photographs is accompanied by descriptive letterpress which, here and there, is lightened by personal touches. The book is attractively produced at a moderate price, and both author and publisher are deserving of high praise. It is to be hoped that, in due course, the present book will be followed by a companion volume dealing with more butterfly lives. A minor error: *Pararge megera* L. is the correct spelling of this name.

A. S. C.

SOCIETIES.

The South London Entomological and Natural History Society.—*October* 25, 1947.—Annual Exhibition in the Libraries of the Royal Society and the Royal Geological Society at Burlington House, Piccadilly, London, W. 1. Over 100 members and friends brought exhibits. Among the Lepidoptera *Colias croceus* and its varieties and *Rhodometra sacraria* were well represented. The living objects included larvae of Lepidoptera and Coleoptera, water beetles, and the Rose Chafer, *Cetonia aurata*. There were also paintings, sketches, drawings and historic books. The attendance was well over 300.

November 12, 1947.—The President, Mr. L. T. Ford, B.A., in the Chair. *Exhibits*: Dr. G. V. Bull, (1) Lepidoptera from Sandhurst, Kent, on the wing exceptionally late, due to the abnormally fine weather of 1947, namely, *Calothysanis amata* October 13, *Acasis viretata* October 23, *Cleora rhomboidaria* September 12, *Pararge megera* October 23, *Polyommatus icarus* October 8, *Lycaena phlaeas* October 17, and *Colias croceus* November 5; (2) Two wasps, *Vespa vulgaris*, with their prey, *Pieris rapae*. Mr. E. H. Wild, *Peridroma porphyrea* larvae from Croydon, Surrey; Capt. R. A. Jackson, R.N., (1) *Rhodometra sacraria*, typical specimens reared from eggs laid by a female ab. *sanguinaria*, Bishops Waltham, Hants, (2) *Nycterosea obstipata* larvae from Polzeath, N. Cornwall; Mr. W. J. Finnigan, (1) *Caloptilia phasianipennella* from Cheam, Surrey, (2) *Ephialtes mesocentrus* (Hym.) from Ashtead, Surrey. The great immigration of *Rhodometra sacraria* was discussed. It was thought that the moths had been brought from Africa by high air currents and had bred rapidly here under the abnormally favourable weather conditions of 1947. Moreover, great numbers had been seen because it had been learnt that the moth frequented fields where *Polygonum aviculare* and *P. persicaria* abounded.—T. R. Eagles, *Editor*, 32, Abbey Road, Enfield, Middlesex, November 1, 1947.

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BUTTERFLIES IN GRANADA.

BY L. G. HIGGINS, F.R.C.S., F.R.E.S.

IT was a great pleasure last year to make plans for a collecting trip abroad, and we were able to realize our wish to visit Andalusia. Spain has changed a great deal in the last 10 years, and a very active official tourist agency is able to give advice and information of all kinds, and issues many folders and pamphlets full of exciting pictures. It is most interesting to make the journey by car, and we arranged to leave England on June 14th. We passed quickly through France, with one brief halt for collecting in the Landes near Bayonne. Swarms of grasshoppers were surging across the road, but there were very few butterflies. A well-marked form of *Lycaena alciphron* and large *Pyrgus serratulae occidentalis* were the most interesting captures. In the evening we entered Spain, and spent the night most comfortably at Vittoria. Next day we went on to Madrid, stopping for an hour or two to collect near Burgos, which looked a very good locality. It was our first visit to Madrid, and we spent two days looking round this beautiful city and examining the collections at the National Institute of Entomology, where we made the acquaintance of Dr. Ceballos, Sr. D. Eduardo Zarco, Sr. D. Ramon Agenjo and other entomologists. These gentlemen, who were most helpful and kind, entertained us to lunch, and did everything possible to ensure that our trip should be a success. We were most interested to discover that a facsimile edition of the fifth part of Rambur's *Faune de l'Andalousie* was published by the Spanish Entomological Institute in 1942, to mark the centenary of the appearance of the original edition. A copy of the facsimile was most kindly given to me by Sr. Zarco.

We left Madrid rather late in the afternoon of June 19, and after spending the night at the Parador at Manzanares, we continued South rather leisurely next day. As Jaen is approached the monotonous flat central plateau gives way to more hilly and undulating country. We made several halts to see what was flying, but found only the commoner species of Southern Spain, although we passed some most attractive country. At Granada we established ourselves at the Parador St. Francisco, which is an attractive Moorish house within the Alhambra precincts, adapted very successfully as a modern hotel, and here we remained for 16 days.

A great deal of hot and tiresome walking can be avoided by using the fine new road which has been made in the Sierra Nevada and actually completed to the top of the Veleta, the highest peak in the west of the range. It is said to be the highest motor road in Europe, is extremely well constructed, and quite usable at the time of our visit, to an altitude of about 8500 ft. Above this it was blocked by snow, and the surface was rather loose. Between 7300 ft. and 8000 ft. there are two mountain chalets used by soldiers and by students from the Granada University, who come up into the mountains for holidays; they all looked very jolly and happy. Along this road at various altitudes there are many excellent places for collecting, and we never strayed far from it. Unfortunately the eastern slopes of the Sierra Nevada are not accessible, and can scarcely be approached without spending some days in the open on the mountains, which would be difficult to arrange. The Sierra de Alfacar is a range of low mountains near the village of Alfacar, about 6 miles to the north of Granada. This is approached by a dusty road full of holes, and is chiefly notable as the home of the bakers who supply Granada with bread. The southern face of the mountains is steep and bare, but there is a good road leading to a high level plateau where low hills and valleys, at about 5000 ft., provide a wonderfully rich collecting ground. There is no hotel within walking distance of these mountains, as the old hotel at Guechar Sierra is now closed, so it is really essential to have the use of a motor-car. Motoring in Spain is enormously simplified by the road houses—Paradors and Albergues—maintained by the official tourist department. We visited four of these establishments, which are placed on long and rather desolate roads, or near centres of exceptional interest for tourists. The accommodation and service are excellent, and there is very good food admirably cooked. More than 20 Paradors are already completed, and I was told that soon there will be nearly three times this number, distributed at suitable places over the whole of Spain. We found the roads excellent, with surface material of granite or slate, and in over 3000 miles we did not have a single puncture. There is little traffic, most towns and villages are by-passed, and a touring speed of 50 m.p.h. or more could be maintained quite easily. There is a great deal of active reconstruction of the roads in progress, eliminating steep hills and sharp curves, and in such places were found the only bad sections we met during our journey.

The butterflies of Andalusia are well known and we did not expect to find anything new. The season last year was undoubtedly exceptionally early, and probably this explained the absence of several insects I hoped to meet. I was particularly disappointed at missing *Melitaea aurinia* and *M. baetica*, and we took no fresh specimens of *M. phoebe*. On the other hand, the high-level species like *Satyrus hippolyte, Erebia tyndarus* and *Aricia ramburi* were all well out before the end of June, and *hippolyte* already rather worn at 7200 ft. Somehow or other we never made a visit to the south side of the Sierra Nevada, about two hours distant by car. Had we done so I feel sure that we should have added to the list of species taken. The heat was very great, and I have never felt less inclined for energetic collecting. As we came home we noticed the marked change to the cooler climate of Madrid and Northern Spain. The weather was superb, one cloudless day followed another until our last day, when the sky was grey and cool. We left the country with many regrets, and resolutions to return again to explore the rich and unique butterfly faunas of other districts, while we shall always keep the happiest memories of this visit.

List of the butterflies taken near Granada :

Papilio podalirius feisthameli Duponchel.—Found up to 5000 ft. Females only taken. Not common.

P. machaon, L.—Seen once near Granada.

Aporia crataegi meridionalis Verity.—Common in the mountains.

Pieris brassicae L.—Seen several times near Granada, but no specimen brought home.

P. rapae L.—Taken here and there in the S. Nevada up to 8000 ft.

P. napi L.—A few taken in the S. Nevada up to 7000 ft.

Pontia daplidice L.—Common everywhere.

Euchloë euphenoides Staudinger.—Seen but not taken in the S. Nevada.

Leptidea sinapis L.—The first brood still fresh at 5000 ft. in the S. Nevada.

Colias hyale L.—Not common on the S. Nevada.

C. croceus Fourcroy.—Abundant everywhere.

Gonepteryx cleopatra L.—Very common in the mountains.

G. rhamni meridionalis Rober.—A very large form of *rhamni* occurred in the S. Nevada, which I saw several times although I was able to take only one specimen. My specimen appears to be identical with a series of *meridionalis* from Northern Africa, and is not at all like the usual European form. Ribbé refers to this insect, which was an unexpected discovery.

Vanessa atalanta L.—Seen here and there; no specimen brought home.

V. cardui L.—Very common.

Aglais urticae L.—Very common.

Nymphalis polychloros erythromelas Aust.—This occurred high in the S. Nevada. The specimens are large and ruddy, and correspond exactly with *erythromelas* Aust. from Morocco.

Polygonia c-album L.—A few specimens in the S. Nevada.

Melitaea phoebe Knoch.—We were too late for the first brood of this species and saw only worn specimens.

M. didyma occidentalis Staudinger.—This insect was flying fresh on the S. Nevada at 7200 ft., and we took a small series. The females show marked *occidentalis* characters.

M. athalia pseudathalia Reverdin.—This species was found on the Sierra Nevada at 5000 ft. The identity has been checked with the greatest care, and we did not see *deione*, which was doubtless already over at the time of our visit. The occurrence of *pseudathalia* in southern Spain is interesting, and I think has not been recorded before.

M. parthenie veletaensis Ribbé.—Flying on the S. Nevada up to 8000 ft. The form is not well characterized.

Argynnis hecate aigina Frühstorfer.—Female specimens and a few worn males were not rare in the S. de Alfacar. My series is too incomplete to judge the characters of the local form.

A. lathonia L.—Very common in the S. Nevada.

A. niobe L.—Not uncommon in the S. Nevada. The specimens are a little paler than ordinary Alpine *niobe*, and have been named *altonevadensis* by Reisser (1927).

A. adippe chlorodippe Herrich Schaeffer.—Very common in the S. de Alfacar, and not rare in the S. Nevada.

A. pandora Schiffermüller.—Common everywhere up to 8500 ft.

Melanargia lachesis Hübner.—Common everywhere.

M. ines Hoffmansegg.—A few worn specimens taken.

M. syllius Hübner.—Common but worn. A few females still in good condition.

Erebia tyndarus hispania Butler.—Common on the north slope of the Veleta, and some already worn at the end of June. Flies from 7000 ft. upwards.

Satyrus circe Fabricius.—A few specimens taken in the S. de Alfacar.

S. alcyone vandalusica Oberthür.—This well-marked form was very common in the mountains, but we saw no females.

S. briseis major Oberthür.—Common, especially in the S. de Alfacar.

S. hippolyte williamsi Romei.—Common locally at about 7000 ft. on the north side of the Veleta. The species was well out before the end of June.

S. semele subcinerea Ribbé.—Occurred everywhere in the mountains and foothills. This rather dark form is not well differentiated, and there is no approach to African specimens.

S. statilinus allionia Fabricius.—This butterfly was very common on the hill behind Granada, always resting in the small oak trees. The specimens are rather large, but otherwise correspond closely with those from other southern European localities, and Frühstorfer's name *musaius* seems superfluous.

S. fidia L.—Males of this species were not uncommon towards the end of June. The specimens resemble those from other localities in western Europe, and there is no approach to the African *albovenosa* Aust.

S. actaea Esper.—Very common in the S. de Alfacar, and already past its best at the end of June. The specimens are rather large but not otherwise remarkable. In the S. Nevada the insect was less common, and male specimens from this mountain do not show the strong white band on the under-surface of the hind wings. These have been named *nevadensis* by Ribbé. The specimens I took suggest that the distinction is still present and constant.

Pararge aegeria aegeria L.—Common in the trees round the Alhambra.

P. megera L.—Common at the lower levels.

P. maera L.—I took one damaged specimen near Granada.

Maniola jurtina hispulla Hübner.—Common, but often badly worn. Many females are extremely large and handsome.

Epinephele lycaon macrophthalma Frühstorfer.—This insect appeared in the S. de Alfacar at the end of June, but unfortunately I confused it with *lupinus* and brought home only 4 specimens, which are much larger than any others in my collection.

E. lupinus Costa.—This species was abundant on the hill behind the Alhambra, and well out on June 20. The form resembles various specimens from Central Asia which are grouped as *centralis* Riley at the British Museum.

E. tithonus L.—Very ordinary specimens were flying near the village of Alfacar.

E. ida Esper.—This was flying everywhere up to about 5000 ft. I have compared my specimens with series from other European localities, without finding any obvious difference, so the distinctive name *marcia* Fruhstorfer seems scarcely required.

E. pasiphae Esper.—This species was also very common, but a good deal more worn than *ida*. None of my specimens shows any approach to *philippina* Aust.

(To be continued.)

LEPIDOPTERA TAKEN AT ARUNDEL IN 1947.

By G. Haggett.

The year 1947 again afforded time and facilities whereby the moths visiting light in my garden could be closely watched, and over a considerable period accurately counted. The accompanying notes are generally similar to those for 1946, recorded in the *Entomologist* of May, 1947, although there are several surprising omissions, and some welcome visitors new to our lists. A period comprising March to the end of November is covered. The following were taken at light:

Sphingidae.—*Laothoë populi*, several in May and July, three in August; *Smerinthus ocellata*, one in late May.

Notodontidae.—*Cerura vinula*, one female in early June: *Stauropus fagi*, four males in June; *Drymonia ruficornis*, one male in May; *Notodonta ziczac*, quite common; *Notodonta dromedarius*, a male in May; *Notodonta anceps*, thirteen males, three females, all in May; *Lophopteryx capucina*, common; *Pterostoma palpina*, two in late July; *Phalera bucephala*, common.

Thyatiridae.—*Habrosyne derasa*, very common, with nights of abundance; *Thyatira batis*, not uncommon, with a partial second brood in August; *Tethea ocularis*, one in late July; *Asphalia diluta*, infrequent in September; *Polyploca ridens*, three; *Achlya flavicornis*, quite common mainly in April.

Lymantriidae.—*Orgyia antiqua*, three males only; *Dasychira pudibunda*, quite common, one melanic male; *Euproctis similis*, very common; *Lymantria monacha*, not very plentiful this year.

Lasiocampidae.—*Malacosoma neustria*, a few males only; *Poecilocampa populi*, males common in November, two females; *Philudoria potatoria*, several males; *Gastropacha quercifolia*, one male in July.

Drepanidae.—*Drepana cultraria*, three males in August; *Drepana binaria*, one male in August; *Cilix glaucata*, common.

Nolidae.—*Nola cucullatella*, very common; *Nola albula*, six males.

Westermanniidae.—*Bena prasinana*, a female on July 31.

Sarrothripinae.—*Sarrothripus revayana*, two in August.

Arctiidae.—*Spilosoma lubricipeda*, very common, sometimes over fifty in one night—two second brood individuals in late August; *Spilosoma lutea*, quite common; *Phragmatobia fuliginosa*, very common, hind wings exceedingly variable; *Arctia caja*, quite common, some good forms; *Callimorpha jacobaeae*, abundant at light this season; *Nudaria mundana*, seven in July; *Miltochrista miniata*, very plentiful with nights of July abundance; *Lithosia* *quadra*, a male in late July; *Eilema griseola*, abundant; *Eilema lurideola*, abundant; *Eilema sororcula*, some fifteen a night during late May and early June.

AGROTIDAE.—*Colocasia coryli*, very common; *Apatele psi*, a few; *Apatele rumicis*, not many; *Craniophora ligustri*, one; *Cryphia perla*, abundant; *Cryphia muralis*, one in August; *Agrotis clavis* (*corticea*), very common and variable; *Agrotis exclamationis*, common and variable; *A. ipsilon*, one in March, a few in August–September; *Peridroma porphyrea*, frequent, but irregular; *Amathes baja*, two only; *Amathes c-nigrum*, very common, specimens up to mid-November; *Amathes triangulum*, one only; *Diarsia festiva*, common and variable; *Diarsia rubi*, common in both broods; *Amathes sexstrigata*, quite common; *Amathes xanthographa*, abundant; *Ochropleura plecta*, common throughout the summer; *Axylia putris*, common; *Triphaena comes*, one; *Triphaena pronuba*, common; *Anaplectoides prasina*, one fine male; *Mamestra brassicae*, not uncommon; *Diataraxia oleracea*, common; *Hada nana*, very plentiful; *Hadena trifolii*, several males in August–September; *Hadena cucubali*, one in early June, common in late July; *Hadena bicruris*, a few in late July; *Hadena serena*, one only; *Eumichtis adusta*, one in May; *Tholera popularis*, males common, two females; *Tholera cespitis*, one only; *Cerapteryx graminis*, two only; *Luperina testacea*, common and variable; *Apamea secalis*, common and variable; *Apamea sordens* (*basilinea*), common; *Procus strigilis*, very common; *Procus latruncula*, several; *Procus fasciuncula*, very common this year; *Apamea anceps*, quite common; *Apamea rurea*, common; *Apamea sublustris*, one only; *Apamea lithoxylea*, not very plentiful; *Apamea hepatica*, very few; *Apamea scolopacina*, two in late July; *Brachionycha sphinx*, eight in October–November; *Meganephria oxyacanthae*, abundant and variable, some quite dark forms; *Euplexia lucipara*, two only; *Phlogophora meticulosa*, not common; *Hydraecia oculea*, not many; *Hydraecia micacea*, very common; *Gortyna flavago*, frequent but in poor condition; *Arenostola lutosa*, seven in September–October, two in November; *Arenostola phragmitidis*, five insects; *Leucania pallens*, common; *Leucania impura*, abundant; *Leucania comma*, two only; *Leucania unipuncta*, a worn female in July; *Leucania albipuncta*, a good male in late July; *Leucania lithargyria*, abundant; *Leucania conigera*, very few; *Meristis trigrammica*, not very plentiful this season; *Caradrina alsines*, most abundant, over a long period; *Caradrina blanda*, one in August; *Caradrina morpheus*, two only; *Rusina umbratica*, common in early June; *Amphipyra tragopoginis*, two; *Cerastis rubricosa*, one only, in early May; *Orthosia gothica*, very common up to May, one var. *gothicina*; *Orthosia cruda*, abundant and variable; *Orthosia stabilis*, abundant and variable; *Orthosia incerta*, abundant and variable; *Orthosia munda*, quite common, all typical; *Cosmia pyralina*, common; *Cosmia affinis*, common and variable; *Cosmia trapezina*, abundant and variable; *Zenobia retusa*, several in July–August; *Zenobia subtusa*, two in late July; *Omphaloscelis lunosa*, one in September; *Agrochola lychnidis*, very common and exceedingly variable; *Tiliacea citrago*, one in late August; *Tiliacea aurago*, eight, over the period from August 31 to November 12, the last taken being quite fresh, all variable; *Cirrhia icteritia*, one only; *Cirrhia gilvago*, two only in September; *Conistra vaccinii*, few in spring, two in autumn; *Eupsilia transversa*, several in early spring, three in November; *Graptolitha ornitopus*, quite common in spring, two again in October; *Xylocampa areola*, two in late April; *Cucullia asteris*, a worn female in late July; *Rivula sericealis*, most abundant; *Scoliopteryx libatrix*, occasional specimens in spring and late autumn; *Polychrisia moneta*, a few only; *Plusia festucae*, two in July; *Plusia gamma*, most abundant throughout the season, including two in November; *Abrostola tripartita*, not very common.

HYPENIDAE.—*Laspeyria flexula*, quite common in July; *Zanclognatha grisealis*, common; *Zanclognatha tarsipennalis*, a few only; *Hypena proboscidalis*, abundant in both broods.

GEOMETRIDAE.—*Hipparchus papilionaria*, one only; *Hemistola chrysoprasaria*, abundant; *Comibaena pustulata*, very plentiful in late June; *Iodis lactearia*, very common; *Hemithea aestivaria*, very common; *Sterrha aversata*, common and variable; *Sterrha biselata*, common; *Sterrha dimidiata*, common; *Scopula marginepunctata*, two only; *Scopula imitaria*, not uncommon; *Calothysania amata*, common; *Cosymbia punctaria*, one of each brood; *Cosymbia linearia*, one in early June, several in July, not uncommon in August; *Cosymbia annulata*, common and variable; *Rhodometra sacraria*, a fresh male in September; *Ortholitha chenopodiata*, abundant; *Ortholitha bipunctaria*, a few only; *Nothopteryx polycommata*, one only; *Mysticoptera sexalisata*, one in August; *Operophtera brumata*, two only so far this winter; *Ecliptopera silaceata*, unusually plentiful, many var. *insulata*; *Lygris mellinata*, very common; *Lygris pyraliata*, common; *Cidaria fulvata*, very common; *Electrophaës corylata*, common and variable; *Dysstroma truncata*, abundant and variable; *Dysstroma citrata*, two in August–September; *Xanthorhoë ferrugata*, quite common; *Xanthorhoë spadicearia*, abundant this season; *Colostygia pectinataria*, abundant; *Xanthorhoë montanata*, abundant; *Xanthorhoë fluctuata*, less common than others of the genus; *Epirrhoë galiata*, one;

Epirrhoë alternata, very common; *Oporinia dilutata*, abundant, one melanic; *Oporinia autumnata*, one in November; *Lyncometra ocellata*, abundant; *Plemyria flavofasciata*, two only; *Euphyia bilineata*, abundant and variable; *Hydriomena furcata*, abundant, very variable including some fine forms; *Caenotephria derivata*, several this year; *Asthena albulata*, not many; *Eupithecia centaureata*, several; *Eupithecia linariata*, quite common; *Eupithecia assimilata*, common; *Eupithecia absinthiata*, abundant; *Eupithecia vulgata*, abundant; *Eupithecia icterata*, uncommon; *Eupithecia tripunctaria*, one in July; *Gymnoscelis pumilata*, abundant in April, and again in August; *Chloroclystis coronata*, very few; *Chloroclystis rectangulata*, abundant; *Pelurga comitata*, not common; *Horisme vitalbata*, regular attendance in small numbers; *Horisme tersata*, exceedingly common this season; *Nycterosea obstipata*, two males in late August–September, a female and three males in mid-November; *Abraxas grossulariata*, quite common; *Anagoga pulveraria*, one in late May; *Lomaspilis marginata*, common; *Ligdia adustata*, very common; *Bapta bimaculata*, unusually plentiful; *Bapta temerata*, abundant; *Cabera pusaria*, abundant; *Cabera exanthemata*, common; *Campaea margaritata*, very common; *Deuteronomos quercinaria*, six in late July; *Deuteronomos fuscantaria*, three only; *Deuteronomos erosaria*, three in late July; *Selenia bilunaria*, very common in both broods; *Selenia tetralunaria*, one male of each brood; *Hygrochoa syringaria*, very common, three in September; *Gonodontis bidentata*, very common; *Crocallis elinguaria*, abundant, one female; *Ourapteryx sambucaria*, common, a male in October; *Plagodis dolabraria*, not uncommon; *Opisthograptis luteolata*, abundant; *Cepphis advenaria*, not many; *Epione repandaria*, two in September: *Theria rupicapraria*, abundant; *Erannis aurantiaria*, four in November; *Erannis marginaria*, very common in spring; *Erannis defoliaria*, very few in spring, only three in November; *Erannis leucophaearia*, three only; *Alsophila aescularia*, very common; *Phigalia pilosaria*, abundant for a week only, otherwise very few; *Apocheima hispidaria*, four males; *Biston strataria*, a few until late April, when common; *Biston betularia*, not many this year, melanic forms scarce; *Hemerophila abruptaria*, quite common; *Cleora rhomboidaria*, abundant; *Cleora ribeata*, two males, one female; *Cleora repandata*, abundant and variable, several var. *conversaria* forms; *Boarmia roboraria*, unusually common; *Boarmia punctinalis*, also common; *Cleora lichenaria*, one in late July; *Ectropis bistortata*, very plentiful for both broods; *Itame wauaria*, common; *Chiasmia clathrata*, very common throughout the season, one on November 19.

PIERIDAE.—The following butterflies were noted at light, having arrived apparently of their own accord: *Pieris brassicae*, a male in early May and another in July; *Euchloë cardamines*, a male in early June.

Throughout the season collecting was also carried on in other nearby localities of West Sussex. In addition to many of the above species being encountered, some more plentifully, several of interest were taken as below described:

Comacla senex, six in the River Arun valley, also *Orthonama lignata* at the same spot; *Tethea fluctuosa*, a male noted in car headlights, *Nola albula*, a new and fairly plentiful colony met with, in company with a host of *Amathes ditrapezium*, a solitary male *Amathes stigmatica*, and several *Apamea sublustris*, *Philereme transversata*, and *Ellopia fasciaria*. *Eilema complana* was common and *Lygephila pastinum* swarmed in our larger woodlands, while the excitement of the chase was enjoyed in the novelty of netting fresh *Gastropacha quercifolia* females which have a rather heavy fluttering flight, flapping their way over low scrub at dusk and are not at all difficult to take in fine condition in this way.

Sugar was employed at intervals from May until September in many varied habitats, but with consistently exceedingly poor results, many complete blanks being drawn. Similarly ivy blossom was worked in October; the only visitors were *Agrochola lychnidis* and a solitary *Conistra vaccinii*.

1, Torton Hill,
Arundel, Sussex;
November 29, 1947.

IMMIGRANT LEPIDOPTERA IN SUFFOLK.—I have taken three *Rhodometra sacraria* here at Stowmarket. The first was a female in good condition, which came to light about September 7, shortly after 7 p.m. A second female, not so fresh as the first, came to light on September 11 at about 7.30 p.m. The third, a male, in perfect condition, with a pinkish suffusion over the fore wings, was kicked up in a clover field on September 16 at Stowmarket. Another immigrant which turned up at Stowmarket in 1947 was *Laphygma exigua*, of which three came to light, a male at about 11 p.m. on August 25, a second male on August 27th about 11.30 p.m., and a female on September 19 in perfect condition. In 1945 at Stowmarket I picked up a male *Heliothis scutosa* on September 7 in the roadway, unfortunately with its abdomen crushed. Two *Leucania albipuncta* were taken, the first at dusk on Foxhall Heath, near Ipswich, on August 9, and the second at light on October 11, at Framlingham, Suffolk.—ALASDAIR E. ASTON; 37, Chilton Avenue, Stowmarket, Suffolk.

VARIATION IN IRISH INSECTS.

By H. C. Huggins, F.R.E.S.

I have recently been re-arranging my whole collection of British Lepidoptera, and in the process have noticed amongst my various Irish specimens the following, which may be of general interest. I wish, however, to emphasize that in most cases the specimens mentioned number under half a dozen, so that these notes must be regarded more as grounds for inquiry from other collectors than statements concerning Irish races in general.

Sesia formicaeformis.—I have three bred specimens labelled "L. W. Newman, Sligo, 1920." So far as I can remember when I purchased these Mr. Newman had a fair number in stock. This represents a considerable extension in the range recorded by Col. Donovan (*Catalogue of the Macrolepidoptera of Ireland,* 1936, p. 17), which only embraces Kerry and West Cork.

Procris statices.—Of five specimens taken at Sandholes, Dungannon, in June, 1938, when I was a guest of Mr. T. Greer, four belong to the brilliant steel-blue form and only one to the usual green type. *P. statices* was common enough at the time, but I overlooked the colour-difference and only set these few for the sake of the locality. I have never seen this form in Kent, where I must have seen hundreds, years ago, at Chattenden, and the few specimens I have taken in the New Forest were all of the green type.

Zygaena lonicerae.—This also was common at Dungannon at the same time, and all my specimens are very much larger than my English ones from Chattenden and Westcliff; I set some 10 specimens and they are uniform in size.

Eustrotia olivana.—Dr. B. P. Beirne in his recent paper on the origin of the British Lepidoptera states that the Irish race is smaller and more brightly coloured than the English. This does not accord with my experience. Half my series is from Glengarriff and half from Wicken and Chippenham, and the Irish specimens are slightly larger than the English. I should not care to dogmatize as regards the colour, as all these moths are now 30 years old, but to-day their colour is practically identical, and I remember when taking my first three at Glengarriff in late April, 1914, when the insect must have been fresh, thinking that they looked duller than those I had taken the previous June at Wicken. My experience of Irish *argentula* is confined to Glengarriff. Col. Donovan informs me he knows no difference between English and Irish specimens

Eurymene dolabraria.—I have two fresh females from Glengarriff, in both of which the central area is pale biscuit colour, almost devoid of the usual transverse striations. These are the only two Irish ones I now possess, as the female taken on an island in Lough Corrib, mentioned in Col. Donovan's Supplement, page 6, was kept for eggs and ruined. I have no similar specimens in my English series.

Ortholitha mucronata (*plumbaria*).—I recently submitted some of my series of this insect to Dr. E. A. Cockayne, and he informed me that a male taken at Glengarriff in late May, 1918, is *scotica*. I caught several specimens of the moth at this time, but this one is unfortunately the only survivor.

875, London Road,
Westcliff-on-Sea.

SCHOENOBIUS GIGANTELLUS AND NONAGRIA SPARGANII IN SOUTH ESSEX.—So far as I can ascertain *S. gigantellus* has not been found in Essex since the late Howard Vaughan, Pryer, and Sidney Webb took it in the now ruined railway ditch at Leigh-on-Sea in the seventies of the last century. My friend the late Dr. Douglas Smart and myself made several attempts to re-discover it in the district without success in the years preceding the outbreak of war. Last year (1947) my son and I made a very extensive search of South Essex, and eventually managed to find it sparingly in one locality. Unfortunately it was a little late in the season, and several specimens, particularly the females from their low flight through the reeds, were somewhat worn. The males were rather interesting, some being the darkest I have ever seen, whilst others had the costal half of the wing nearly black and the lower portion light drab—a rather striking form I have not taken before.

In the course of our explorations we turned up several interesting species, amongst others *Nonagria sparganii*, which I am informed has not been previously recorded in Essex. No doubt owing to the very hot season this was on the wing very early. It was well out and some specimens worn when I first saw it on July 14, and was over by mid-August, whereas previously I have found it a month later in Kent and elsewhere. I took all the forms I have seen in Kent except the unicolorous red form; no doubt this was also present, as I took one beautiful specimen, unfortunately too worn to keep, of a bright brick red with a wide black streak down the centre of the wing. *N. sparganii* has feeding habits in this locality different from those usually ascribed to it, as no *Iris pseudacorus* or *Sparganium ramosum* grow there; it was feeding on *Typha angustifolia* and *T. latifolia*. It is usually said to feed in its earlier stages on *I. pseudacorus* and then move to *Sparganium*, and finally to *T. angustifolia*, but Mr. H. M. Edelsten, with whom I have been in correspondence on the subject, tells me that in one Kentish locality it feeds on *T. latifolia* alone.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

PAPERS ON MALAYSIAN RHOPALOCERA: IV. A NEW SATYRID BUTTERFLY FROM MALAYA.

By A. Steven Corbet,
British Museum (Natural History).

A rather surprising addition to the Malayan Rhopalocerous fauna is the Satyrid *Ethope diademoides* (Moore), which has hitherto been known only from south Burma, western Siam and Hainan. The species appears to be nowhere common, and, in Burma, it has not been found north of the Karen Hills; the Siamese specimens in the Natural History Museum are two males from Ban Klong Klung (long. 99° 22′ E., 16° 6′ N.).

The first authentic Malayan specimen of *E. diademoides* known was taken in north Kedah in June–July, 1945, by Major J. A. Hislop, while operating behind the Japanese lines. Owing to a lack of preservatives, the collection of which this specimen formed part was ruined by mites, but Major T. A. Wight brought the remnants home to the Natural History Museum. Major Hislop revisited the locality in 1947 and obtained two further specimens of *E. diademoides*.

Ethope diademoides hislopi subsp. n.

♂. Nearer to the subspecies *henrici* (Holland, 1887), from Hainan, than to the nominotypical form *diademoides* (Moore, 1879), from Burma, in general appearance and in the size of the white spots. Differs from *henrici* in that, on the fore wing, the white post-discal spots in spaces 1*b*, 2 and 3 are much smaller, and those above vein 3 are very small or obsolete. On the hind wing the white, oval, post-discal spots are larger and more rounded, but the spot in space 7 is a large white dot. Fore wing, 35·0 mm.

Malaya, North Kedah: ♂ (B.M. Type No. Rh. 15096), Sungai Lasor, 2.v.1947; ♂, Sungai Pial, 30.iv.1947 (with malformed left hind wing); ♂ (four wings only), Junction of Sungai Pial and Sungai Lasor, June–July, 1945. All taken by Major J. A. Hislop.

Macroglossum stellatarum in January.—Yesterday, January 3, I was amazed to see a *M. stellatarum* flying down Queen's Road, Brighton, during very light rain. I had no doubt of its identity. It was extremely common at Brighton last summer and autumn.—W. G. StJohn; 23, Tennis Road, Hove, Sussex.

Miss D. T. Bullock, of "Woodways," Guildford, tells me that on January 3 in the early afternoon she saw a *M. stellatarum* in flight round Virginia creeper on the wall of her house. It flew indoors and settled in a dark corner, but next day was gone.—George C. Holroyd; 8, Elmside, Onslow Village, Guildford.

AN ABNORMAL BROOD OF *LEUCANIA IRREGULARIS* WALKER.

By D. G. Sevastopulo, F.R.E.S.

I recently bred a brood of the above which contained at least four larvae with segmental abnormalities. Some two hundred and fifty ova were obtained, laid in folded grass blades, from a female attracted to light, and all hatched. The grass containing the ova was kept in glass jars and the ova hatched before the grass had withered. The resulting larvae were divided into three batches, two of which were, most unfortunately, completely wiped out by intestinal trouble. The third batch did not suffer and grew normally. The larvae were actually reared to provide insect food for cage birds, and when they had reached the fourth instar, and were big enough to examine easily, I went through them for abnormalities, with the result recorded above.

In three out of the four larvae, the abnormality consisted of an outward angling of the subdorsal stripe on the 7th somite, the lines below it also being slightly angled. The fourth example was more extreme, and in this the dorsal line had a projecting tooth to the right on the 7th somite and to the left on the 8th, the subdorsal stripe having an outward angle to accommodate it in each case, whilst the body was slightly angled, the dorsal line of the portion from the 8th somite backward being slightly to the left of the dorsal line from the 7th somite forward. The general effect was not unlike the larva of *M. neustria* L. figured by Classey (1942, *Entom.*, **75** : 152), except that there is no normally marked somite between the two abnormal ones. I have found it extremely difficult to trace the actual structure of these larvae, but, judging from a pupa obtained from one of the three less abnormal ones, there is a partial median fusing of the tergites of two somites in these.

The most abnormal larva and one of the other three were blown, and the intention was to rear the other two and then, if the sexes were different, to pair them together, if not, to obtain pairings between them and normal examples of the same brood. One larva was found to have died after burying itself, but the other produced a male pupa, the imago emerging satisfactorily. The female of the same brood, with which it was kept, eventually laid large batches of ova, but these failed to change colour and were obviously infertile. I am unable to say for certain whether pairing took place.

In the one pupa obtained there is a distinct break in the intersegmental ring dorsally between the 7th and 8th somites. This is very noticeable, as the pupa of this species has a series of transverse dentate dorsal ridges, and one of these is broken in the middle. In the imago the posterior edge of the 7th somite shows a central break, so that the posterior edge of the somite appears to be in two parts.

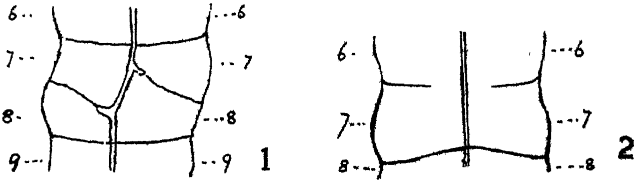
Four abnormalities in 85 larvae do not seem to fit into any Mendelian ratio, but it is, of course, impossible to know what the other two batches contained.

I am indebted to Mr. C. N. Hawkins for the supplementary particulars contained in the following note :

Note by C. N. Hawkins, F.R.E.S., on the above Communication.

Mr. Sevastopulo kindly sent me for examination the male imago, the two blown larvae and the empty male pupa to which he refers. The fact that the abnormalities, though not identical in all four larvae, always affected the 7th (4th abdominal) somite and one or other of the adjoining ones is certainly suggestive of some genetic factor, in this case at least, though there is, unfortunately, no evidence that there were not other kinds of, or otherwise situated, abnormalities in those portions of the brood which were lost through disease, and the failure of the attempt to carry on the strain has once again prevented definite proof.

Of the blown larvae, that referred to as " the most abnormal one " is a fairly typical example of a dorsal left-handed spiral affecting the 7th and 8th (4th and 5th abdominal) somites. The right-hand tergite of the 7th and the left-hand tergite of the 8th somites are reduced in length as they approach the mid-dorsal line, while the opposite tergites of these somites are correspondingly lengthened so that they meet, at the dorsal line, not only with the other tergite of their own somites respectively, but also with that of the somite adjoining as in Fig. 1.



FIGS. 1 AND 2.—Larval abnormalities in *Leucania irregularis* Walker (diagrammatic).

Although Mr. Sevastopulo implies that the three other abnormal larvae were similar to each other I do not think this can have been strictly so, judging from the empty pupa (and its imago) and from what I can make out from the second blown larva which he sent me. It is true that the 7th somite is involved in each example sent to me and that the abnormality appears to be of a similar type, but apart from the distortions of pattern, etc., which Mr. Sevastopulo himself mentions, there appears to be a junction, in the case of the larva, between the tergites of the 7th somite and those of the 6th at and near the mid-dorsal line, as in Fig. 2, whereas in the pupa (and imago) there is, instead, a similar junction between those of the 7th and 8th somites. In the larva, too, both tergites of the 7th somite are evidently slightly shortened towards the mid-dorsal line, causing the blown larva to exhibit an upward tilt forward of this point; some, at least, of the dorsal setae appear to be missing also.

At first sight, and were only one instance involved, I should have felt inclined to attribute this latter type of abnormality to a healed cuticular injury, but the similarity and symmetry of the abnormality in these three cases seems against the probability of this, though exactly in what way it is related to the case of spiral segmentation is difficult to see.

The sketches are diagrammatic only and do not show the subdorsal stripes.

NOTES AND OBSERVATIONS.

Gynandrous Argynnis aglaia L.—While collecting in "The Warren" at Folkestone in August, 1946, I had the good fortune to take an *A. aglaia*, which on examination proved to be a gynandromorph in good condition except that there is a chip between veins 1 and 3 on the hind margin of the right hind wing, and a smaller one at the anal angle of the left hind wing. The right fore wing measures 35 mm. and is of typical female form; the left fore wing measures 30 mm. and is male. I have not examined the genitalia.—J. H. Payne; 10, Ranelagh Road, Wellingborough, Northants, January 10, 1948.

A Season's Observations on Colias croceus.—My wife and I first saw *C. croceus* on May 30 at Shepton Beauchamp, Somerset. On that day, and the two following ones, we counted about three dozen, including one *helice*, flying at about 12 m.p.h. in an easterly direction. They were all in excellent condition. The males seemed to outnumber the females by about ten to one. On June 4 at Lulworth Cove, Dorset, we saw six males flying in from the sea between 1300 and 1400 hrs. They all flew off in a north-easterly direction. From then until June 26 we were on Salisbury Plain, and saw no more of the species. On June 26 we again moved to Lulworth and saw our next *C. croceus* on July 24, flying aimlessly up and down a chalk hillside. A gap of four days, and then on July 28 we discovered a field of red clover (*Trifolium pratense*), in which there were about two dozen of the species flying around fairly slowly. We visited this field regularly for the next three weeks, and found that its population increased steadily until about August 15, on which date a lot of the specimens were very worn. By August 20 the population had decreased to about half of its peak strength.

From August 21 until September 3 we saw no specimens at all at Shepton Beauchamp, nor any at Durrington, Wilts, between September 4 and 26. On September 27 at Shepton Beauchamp we saw about fifty *C. croceus* in two hours, and on the next two days the numbers did not change appreciably. The majority (about 90 per cent.) were males, and only one *helice* was seen. All were flying in a southerly direction. On September 30 we saw a few very fresh males at Durrington. From that date until October 28 we visited a red clover field at Durrington regularly, and noticed that males were predominant from September 30 until about October 14. After October 28 we saw no more specimens, and presumed that they had been killed off by a cold spell. On November 7 we saw one male and two females, one of which was an *helice*, at Porthcurno, Cornwall, 5 miles from Land's End.

On comparing the different specimens caught in various parts of the country, we have come to the conclusion that there is a distinct possibility that there were two different types of *C. croceus* in England last summer. In " Type A " the male, female and *helice* have the outer edge of the fore wing in a concave curve (this is most pronounced in the larger specimens), the edge of the hind wing is more sharply angled than is " Type B," the black spot on the fore wing is smaller than in " Type B," and the general ground-colour is, on the whole, slightly paler. In " Type B " the outer edge of the fore wing is in a convex curve, the edge of the hind wing is rounder, the black spot on the fore wings is larger, and the ground-colour is darker. It may be that we have made a quite unwarranted distinction between these two types. They may, in fact, both be within the normal range of variation of the species. On comparing the shape of the wing scales under a microscope, we believe that there is a slight constant variation between the two types. We have not, however, had sufficient experience to carry out our experiments any further, and would therefore be very interested to know if any others have noticed, or tried to differentiate between the two types.—CAPT. J. C. S. MARSH, R.A., F.R.E.S.; Rest Harrow, Windsor Road, Durrington, Wilts, January 5, 1948.

FURTHER OBSERVATIONS ON COLIAS CROCEUS IN 1947.—So many further notes have been received about *Colias croceus* last year that space is not available to print them all in full. What follows is the result of an attempt to extract their salient features. Capt. A. W. H. Row follows up his previous note (see *Entom.*, **80**: 289) by reporting that after the period of scarcity at Weymouth in September the insect began to return, and between October 1 and 15 he saw more than ever before in his life. He was doubtful, because of the local scarcity of food, whether these were a new local generation, and considered they might have been due to a return flight, or a new immigration. The former probability is strongly supported by Lt.-Cmdr. J. Blake's observation (*Country Life*, November 7) of a very large movement of the species in a southerly direction across the Channel on October 14, and a number of similar observations made about the same time by others and now filed with Capt. Dannreuther. Of 41 taken by Capt. Row, the 26 females included 6 *helice* or *pallida*, constituting a perfectly graduated colour series from pale biscuit tint to plain white. Another letter covering a long period from Capt. J. C. S. Marsh is printed above. In contrast to the experience of most observers, W. J. Hooper's report that in several hundred *croceus* examined at Colyton, Devon, no *helice* was found is of interest. In Cornwall, at Newlyn, D. E. Bowden reports *croceus* abundant in August, taking 16 newly emerged *helice* and *pallida* and 2 males which he attributes to ab. *chrysotheme* on August 16 and 19. The females were remarkably variable. The latest observed were on November 13 and 16. In S.W. Scotland B. M. Oliver observed *croceus* daily in some numbers at Rockcliffe, Kirkcudbrightshire, from September 1 to 7, when the weather broke and no more were seen; he also observed one at Dumfries on September 1 and three at Hexham, Northumberland, on August 31. In Nottinghamshire P. Wynne saw the first *croceus* he had ever seen in the county at Upton on September 30.

Some of the last occurences are represented by two at Guildford, Surrey, on October 23 (R. L. Wilks); November 4 at Southsea (H. F. Hunt); early in November at Salisbury, nothing else on the wing (C. M. Gummer); and December 4 at Sidmouth (E. Pritchard, *The Times*, December 10).—Ed.

Some Notes on Nymphalis polychloros L.—Now that *N. polychloros* appears to be on the increase in this country, a few notes on its behaviour in the wild state and in captivity may be of interest. On April 16, 1947, as the weather was warm and settled, I went down to Suffolk, which has for many years been known as a headquarters of this species in Britain. That afternoon was exceptionally hot for the time of year, but in three hours' walking round the woods I saw nothing but a moderate number of *Aglais urticae* and *Nymphalis io*. Next day was equally fine, and I tried another large wood in the neighbourhood. Here at 12.0 (B.D.S.T.) I saw a *polychloros* flying low and slowly across a small clearing near the edge of the wood, and thinking it was about to settle I did not attempt to catch it. However, it flew over the trees to the ploughed field outside and I saw no further sign of it. A careful search of similar clearings produced nothing until about 3 p.m., when suddenly a number of *polychloros*, perhaps twelve in all, started flying in and outside the wood round the place where I had seen the first one. In the wood they seemed to settle mostly on the tree-trunks, perhaps feeding on putrescent matter, but probably just sunning themselves; in the ploughed field outside they rested on the bare ground—a heavy clay soil baked hard by a week of hot sun. They were not at all easy to catch, but by stalking them very carefully from behind I managed to take about half a dozen. None were in good condition, and only one was obviously a female, which settled on a tree and gave me a clear view of its body much distended with eggs. They had clearly hibernated in this part of the wood, which contained a good many rotten tree-trunks and piles of dead wood. I failed to find any elms inside the wood, but there were some in the hedgerows at no great distance, and there were plenty of large sallows in bloom, though these did not seem to attract them for feeding or egg-laying. About 4.30 they all disappeared as suddenly as they had come, but I found one more about an hour later in the original wood I had visited the day before. The next day was much colder, with a strong easterly wind, and I only saw one in the morning, which got up from a damp place in the middle of the wood and flew over the trees, and two in the afternoon, one of which I recognized as a very worn male I had seen the day before sitting on exactly the same patch of bare ground. On the way home I passed along the edge of a third wood, and saw one more battered specimen. Evidently the species is widely distributed in this area, and I suspect that it occurs in all the woods, though probably not in large numbers.

On April 18 I returned home to Eton, and at once put the known female in a large muslin sleeve draped over a small elm seedling about 3 ft. high in my garden. In another sleeve I put two others, one of which seemed to be a female, but I could not be certain while it was alive, and as soon as it died it was devoured by earwigs. For the next ten days the weather was cold and cloudy, and the insects remained in an attitude of hibernation at the top of the sleeve, refusing all nourishment and totally disinclined to lay any eggs. I fed them regularly with sugar and water, but never detected any of them feeding, though doubtless they did so. During the last day or two of April some warmer weather brought them to life, and the female laid a large batch of some 150 eggs six inches from the top of a stem about $\frac{1}{10}$ in. in diameter. Some 40 more eggs were also laid later low down on the netting, probably in the female's expiring moments, but this batch did no good, as they evidently resented being moved on to the food-plant even with a fine camel's hair brush and all died. The first batch hatched on May 15 and started feeding at once in a web. To lesson the risk of parasites I moved them indoors and fed them on cut branches of elm, which lasted fresh for almost a week in water. When not feeding they rested on the leaves, usually on the underside, always very close together and frequently touching each other. When changing their skins they rested mostly on the top and sides of the cage for about three days. The bulk of them moulted on the following dates: May 25, May 29, June 4 and June 11. In the last moult they ate prodigious quantities of food and required considerably more room, so I separated them into five groups of 30 each. Pupation took place between June 23 and 28, and the "imagines" emerged between July 13 and 23. About 50 of the pupae failed to emerge, though I could find no trace of parasites. I suspect that the atmosphere was not damp enough, since the insects appeared unable to split the pupa-case, and drowned themselves in their own effluvia. Others shrivelled up, and a few, though apparently quite healthy, just perished of inanition. Altogether about 90 perfect insects emerged, all of a fine size but showing remarkably little variation. The females tended to be yellower in tone than the males, and the submarginal spot at the inner angle of the fore wing in some specimens showed signs of coalescing with the basal spot; but there was no trace of blue scaling in the fore-wing margin. I found the sexes in many cases extremely difficult to distinguish by any of the methods recommended, and had to rely largely on the somewhat sharper angle of the outer margin of the male hind wings, and the generally fuller build of the females. But I am by no means certain that I have labelled them all correctly. —N. G. WYKES; Holland House, Eton College, Windsor, November 16, 1947.

SECOND BROOD OF SPHINX LIGUSTRI.—During the summer of 1947 about a dozen larvae of this species, bred from North London stock, were sent to me. The larvae, which were half grown when I received them, started going down to pupate on August 3. In September I dug up the pupae, and noticed that faint wing markings were showing on one of them. From this pupa a perfect female emerged on October 2. The larvae and pupae were kept in conditions which were somewhat cooler than those outdoors. I do not know of a second brood of this species being recorded before.— SINCLAIR SWANSON; Keiss Village, Wick, Caithness.

AN AUTUMN EMERGENCE OF DEILEPHILA ELPENOR L. IN STAFFORDSHIRE.—In mid-October a young man from this village brought me a matchbox containing an example of the above species. He said he had found the larva in August crawling on a piece of waste ground. He placed it in a jar with some nettle leaves and it subsequently pupated in a curled-up leaf. I asked him whether it had eaten any nettle and he declared that it had, but I am fairly sure it was full-fed when he found it and seeking a place for pupation. The moth was quite normal in size and perfect in every way except for an almost microscopic close corrugation of a small area on the lower half of the fore wing towards the base.—H. W. DALTRY; Bar Hill, Madeley, Crewe.

THE SPREAD OF HYLOICUS PINASTRI TO SUSSEX.—Capt. R. A. Jackson, R.N. (*Entom.*, 77: 171) forecast as long ago as 1944 the possibility of *H. pinastri* spreading eastward from its Dorset home. Mr. Henry B. Lawson (*Entom.*, **79**: 234) records it in some numbers from West Sussex in 1946. This year my son and I have taken three imagines and dislodged four larvae from pine trees as far east as the neighbourhood of Storrington, and I understand Mr. Haggett has likewise taken the species there. In conjunction with other records, I think there now exists enough evidence to prove that the species is fairly established in Sussex, and that the spread eastwards is confirmed.—Cmdr. G. W. HARPER, R.N.; Bramblewood, Bushby Avenue, Rustington, Sussex.

MACROGLOSSUM STELLATARUM IN NOVEMBER.—On November 5 I was shown a living Humming-bird Hawkmoth in good condition, which had been taken that morning fluttering on the inside of a window at Beckenham, Kent. It is unlikely that it could have been long indoors without discovery and the rather late date seems worth recording. There had been several night frosts prior to the date of capture.—D. E. KIMMINS; 6, St. John's Road, Penge, S.E. 20.

FURTHER REPORTS OF RHODOMETRA SACRARIA.—John Howell (Lychwood, Worplesdon Hill, Surrey) reports what must have been one of the earliest captures last year, namely, a fresh female in his light trap on May 30, at Bryanston School, Blandford, Dorset. He also records some two dozen specimens in September from near Beachy Head (and apparently Dorset), and two at light in Dorset again in October. Capt. J. C. S. Marsh also reports one from Dorset (Lulworth Cove, August 13), and another from Shipton Beauchamp, Somerset, September 27. E. C. Pelham-Clinton also reports it from Somerset, near Porlock, the first on June 12 and a second on September 19. C. Wainwright took one in September at Olton, Warwicks; and still further afield it was taken in Castletown, Isle of Man, by C. I. Paton on November 7. From Suffolk H. E. Chipperfield reports 17 taken between Ipswich and Stowmarket in September, mostly in stubble fields. Near Ringwood W. H. Jackson secured at Poulner 11 specimens on October 6, from one of which, a female ab. *sanguinaria*, he reared a brood of 36 in 34 days (at 75° F.), of which 16 males and one female were pale canary with crimson streak, one male and 18 females cream with brown streak. Variation seems to have been remarkable, especially in the later broods, and I have not attempted to cover this aspect of the notes extracted above. It will, I hope, be the subject of an article later. For the same reason the more noteworthy Sussex captures, which Cmdr. Harper gently chides me for omitting, are also not reported in detail now.—N. D. RILEY.

A RECORD OF EVETRIA LOGAEA DURR. FROM AVIEMORE.—On April 18, 1947, I took three moths of this species among small Scots firs (3–10 ft. high) near Aviemore. These were disturbed by beating, and about a dozen were seen in all, but they were difficult to net, as they made a short, quick flight, and went down among the long heather, refusing to rise a second time. There was a strong wind blowing at the time, and probably on a calm day there would be little difficulty in taking them. In markings they resemble *Evetria posticana* Zett. rather closely, and I did not identify them for certain till later, when I examined the genitalia of one male, which fortunately determine the species very clearly. In the same area *E. posticana* was on the wing in considerable numbers a month later, and a slide was made of the male genitalia of this species for comparison. In a normal year *E. logaea* might be out a week or so earlier, as after the severe frosts of 1947 most moths were about a fortnight behind their usual time in April. As to its distribution in this country Meyrick says, "Elgin, local; not recognized elsewhere, but probably imported." The trees in the Aviemore locality are certainly self-sown, though there are, or were, plantations of Scots fir two or three miles away. Elgin is 40 miles to the north-east, but the Spey valley is a ready link between the two districts.—D. A. B. MacNicol; 52, St. Albans Road, Edinburgh 9.

RECENT LITERATURE.

The Origin and History of the British Macro-Lepidoptera. By Bryan P. Beirne. *Trans. R. ent. Soc. Lond.*, **98**: 275–372.

In this paper we have a gallant attempt, involving labours of no small dimensions, to throw light on the origin and history of British Macro-Lepidoptera. Three lines of attack are employed: (*a*) Ecological Evidence, (*b*) Taxonomic Evidence, and (*c*) Zoological Evidence. As a result, Dr. Beirne arrives at the conclusions that all of our existing species of Macro-Lepidoptera reached the British Isles by migration from abroad, mostly by passing over land-bridges no longer in existence. He insists that no evidence is available suggesting that any British species dates from times prior to the Upper Pleistocene Glaciation except, perhaps, a few, characterized as Lusitanian, which may have arrived during the Third Interglacial Period. Further, he maintains that the chief influxes took place during the first interstadial phase of the Upper Pleistocene Glaciation and in post-glacial times. In addition, a comparatively minor number of species of temperate proclivities is regarded as having come to our area during the second interstadial phase, whilst certain forms, typical of colder climates, are supposed to have arrived during the three glacial phases which alternated with the milder interstadial stages.

Broadly speaking, there can be no serious disagreement about most of these conclusions, but we must point out that the whole of Dr. Beirne's evidence is inferential, and that the same type of evidence has been utilized by workers in other groups to establish the view that some of the forms with which they dealt have survived from Pliocene times until the present day. Degelius, for example, working with lichens, believes that Atlantic species exemplified by *Parmelia atlantica* and *Pseudocyphellaria crocata*, which are to be found in the British Isles, must be treated as forming a "Reliktelement des Tertiärs in Europa." We, ourselves, have made like deductions in respect to the moss, *Myurium hebridarum*. If our conceptions are well founded, there are no reasons for assuming that lepidopterous insects have not survived likewise.

Whether the evidence cited by Beirne affords satisfactory support to his position is quite another matter, and, in following out the details of his arguments, it becomes quite obvious that errors in detail, especially in respect to distribution, are numerous and even serious; in fact, even some of his maps are more or less incorrect. On the very first page of the discussion we are informed that *Hydraecia paludis* and *Oporinia christyi* do not appear to have been found outside the British Isles, whereas the truth is that both species have a fairly wide distribution on the Continent. Again, the lists of species upon which his arguments are based are constructed in a very arbitrary manner, with the result that they often include very strange companions. With the space at our command it is impossible to examine the whole of these. We shall confine ourselves to a brief consideration of the first and the last.

The first, a list of " suspected " migrants, appears on pp. 279–280. No one with a field knowledge of the ranges and geographical variation of many of the species included here could possibly regard all as migrants. Attention is specially directed to such species as *Spilosoma lutea*, *Actebia praecox*, *Anchoscelis lunosa*, *Selenia bilunaria*, *Euphyia bilineata*, *Crocallis elinguaria* and *Lophopteryx capucina*, which extend to the Hebrides, and also to *Lycia hirtaria*, of which the English and Highland Scottish races are so different.

Turning now to the last list (pp. 352–355), which purports to contain the post-glacial arrivals which " cover " the whole of Ireland, we find that over 50 per cent. of these occur in the Outer Hebrides and in the Rhum and Coll groups. Now on p. 343 we are informed that the reason why so many post-glacial species found on the Scottish mainland are absent from the Outer Isles and the Rhum and Coll groups is that these islands were not united with the mainland in post-glacial times. That statement evades the real issue, which is to determine why, if that were indeed the case, such a heavy percentage have managed to reach the islands in question. Either Beirne is wrong in assuming that no land connections existed, or the species concerned, sedentary as many are, have " flown " over. Fortunately, amongst the insects in this and allied lists are species, like *Erannis marginaria*, *E. defoliaria*, *E. aurantiaria* and *Phigalia pedaria*, with apterous females. As these species, with many apterous forms from other groups, must have made the passage over dry land, the inference is strong that suitable land connections did exist in the Hebridean area after the close of the Ice Age—a view confirmed to the hilt by our examination of the peat deposits in the Isles of Rhum, Barra and South Uist by pollen analysis methods. Further, as his statement at the top of p. 282 shows, Beirne has attached too little weight to the extensive isostatic movements, now registered in the 100 ft. raised beach observable on many Hebridean islands, which took place in those regions in Boreal and Atlantic times.

As bearing upon this point, the insects mentioned on pp. 311, 312 as being represented in the British Isles by two races, one interstadial and the other post-glacial, require attention. In the case of *Lygris testata* both forms concerned occur in the Outer and Inner Hebrides, but it is quite certain that neither is of racial standing there, nor is it attached to special habitats and food-plants. As for the two races of *Hydriomena furcata*, both are to be found in the Outer Isles as well as in Coll and Rhum, one depending upon sallow and hazel, and the other on bilberry. Again, the so-called "subspecies" of *Operophtera brumata* labelled *myricaria*, instead of depending solely on *Myrica gale*, can only be beaten on Rhum (and in Northumberland!) from birch, and moreover, any batch of larvae from favoured areas produces both of the alleged subspecies. On Rhum, likewise, *Oporinia autumnata* and *O. filigrammaria* live side by side. Finally, we have displayed before us the old-fashioned "*tephrosia* tangle" in a new guise. It is true that there is a univoltine race of *Ectropis bistortata*, ranging from Yorkshire to the Caledonian Canal and extending to Rhum and Raasay, but it is certainly not the distinct single-brooded species *E. crepuscularia*, which seems, as far as Great Britain is concerned, to stop short at the Tyne Valley.

Taking all these facts, distributional and taxonomic, into account, it is manifest that their import is equivocal, and we therefore see little in them to support the deductions based on them by Beirne. They prove, we feel sure, that he is too prone to elevate doubtful forms to the level of subspecies or races. Of this we see a particularly unfortunate example on p. 341, where he refers to a race "*appimaria*" of *Oporinia dilutata*; this is no other than our old friend the aberration *approximaria* of the related species *O. autumnata*, which is liable to crop up at any point in the range of that species.

In addition, the remarks made above demonstrate the inadvisability of attempting to employ the food habits of such species as indicating the distribution of British plants in late glacial and other times. Many of the plants included in the last paragraph of p. 360 as being exterminated in the Hebrides, "at least inland," after the first interstadial, receive their place there by a *non sequitur*. Moreover, phytogeographers like Tyge Böcher, working in the Faeroes, and ourselves in the Hebrides, have come to regard *Hypericum* and *Brachypodium* as not only of glacial origin, but also as indicative of relict stations!

On p. 361, following the paragraph with which we have just dealt, we have two further remarkable statements. *Epione paralellaria*, feeding on *Salix*, is cited as demonstrating that birch was common on the land areas stretching to the west and south-west of the British Isles during the second glacial phase, whilst *Thera variata*, attached to spruce, known to have vanished as a native British tree long ago, is alleged to prove that spruce survived in the same area. What the Northumberland and Rhum colonies of *T. variata* prove we are not informed.

In spite of the above criticisms of Beirne's paper, and of the fact that it cannot be regarded truly as a pioneer piece of work, it is our considered opinion that, on the whole, it forms a valuable contribution to our knowledge of British entomogeography, likely to encourage others to tackle the same problems, and to extend their investigations to other insect groups. We sincerely trust that more of our younger entomologists will display Dr. Beirne's spirit of enterprise and originality.

J. W. H. H.

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BUTTERFLIES IN GRANADA.

By L. G. Higgins, F.R.C.S., F.R.E.S.

(Concluded from p. 29.)

Coenonympha dorus andalusica Ribbé.—Common everywhere on open stony ground. In this form the spots on the hind wings are reduced, and this appears to be quite constant.

C. pamphilus lyllus Esper.—Abundant on the hill behind the Alhambra, and also seen in the S. de Alfacar.

Thecla spini Schiffermüller.—Common in the mountains at moderate levels. The females showed a wide orange suffusion on the upper surface usually referred to *lynceus* Hübner.

T. ilicis Hübner.—Common but worn at the end of June.

T. esculi Hübner.—Appeared commoner and more widely distributed than *ilicis*.

Zephyrus quercus iberica Staudinger.—Found only in the oak trees on the hill behind the Alhambra, and fully out when we arrived.

Lycaena phlaeas L.—Very common everywhere. All specimens seen showed marked *eleus* characters.

L. alciphron granadensis Ribbé.—Common in the S. Nevada from 7000 ft. upwards, and well out when we arrived.

Lampides boeticus L.—Occurs everywhere at low levels, on cultivated fields, etc.

Tarucus telicanus Lang.—Also quite common, but many specimens very worn.

Plebejus argus L.—An abundant butterfly in the mountains. The specimens show a good deal of variety, and the underside varies from white (*hypochiona* Rambur) to pale brownish-grey (*vacaresa* Ribbé). I cannot really separate all specimens into two distinct forms.

Turanana baton panoptes Hübner.—One specimen was taken in the Sierra Nevada, but with this exception we missed the first brood. I was disappointed that we did not see *T. abencerragus* Pier., but Signor Agenjo tells me that this species is known from relatively few habitats.

Aricia agestis calida Bellier.—Common everywhere up to 6000 ft. All specimens we took are referable to the form *calida* Bell., with well-marked orange macules and the ground-colour on the under-surface bright chestnut. The series shows little variation.

A. montana Ruhl-Heyne.—We took this well-marked form in the mountains from 5000 ft. upwards. Quite often I have seen *calida* and *montana* together upon the same plant, and I believe that Sagarra (4) and Querci (5) are right in urging specific separation, and this has been done by Zerny (6). This is certainly one of the characteristic butterflies of the district, and Oberthür's figures in the *Lep. Comp.* are admirable (nos. 2372/73).

A. ramburi Verity.—Appeared about the end of June, and soon became common on stony slopes on the Veleta from 7000 ft. up to 9000 ft. As Dr. Chapman has pointed out, a small species of *Erodium* is usually to be found growing near the flight places.

Polyommatus icarus Rottemberg.—Very common at low levels. All specimens correspond with the form *celina* Aust., and differ strongly from central European specimens. Most female specimens are dark.

Polyommatus amandus tova ssp. nov.—This species flew at one locality on the Veleta at 5500 ft. Most were already worn out, but three were taken in good condition. They differ from the usual form of Central Europe in several particulars, and especially in the complete pattern on the under-surface, where the spots do not show the tendency so common in this insect to small size and obsolescence. In the males, on the upper surface, the discal spot of the fore wing is plainly visible, and the dark border along the outer margin is wide. On the under-surface the ground-colour is slightly darker grey than usual. The post-discal spots are well developed, and the series is irregular in cellule 2 of both wings, where the spot is placed further proximally than in other specimens I have seen. The dark submarginal lunules are present and complete on the fore wings from cellule 1 to 6, and the marginal internervular dots are also clearly present. In the single female taken the discocellular spots on the upper-surface are large and distinct. There are clear orange marginal lunules on the hind wing from cellule 1 to 5, and traces can be seen also in cellules 1 and 2 of the fore wing. On the under-surface the black spots are all large, and the irregularity in cellule 2 is marked on both wings. There is in the collection at the British Museum a short series, *ex* coll. Graslin, also from the Sierra Nevada, which show the same characters as my specimens. In this series 3 out of 4 ♀ show wing-bases dusted with blue. It seems probable, therefore, that these specimens represent a new race, for which I propose the name *tova*. Specimens of *amandus* from the Central Pyrenees show little approach to this form, nor do the specialized features appear in *abd-el-aziz* Blachier, from Morocco. The species is rare and local in Spain, and I have no material to show the distribution beyond the Sierra Nevada.

Holotype ♂; allotype ♀ and 1 paratype ♂ in my collection, all from Sierra Nevada, 5500 ft., June 22–28, 1947. Four ♂, 4 ♀ in British Museum *ex* coll. Graslin.

P. hylas golgus Hübner.—Single specimens of a "Blue *hylas*" have been recorded from the Sierra Nevada by Ribbé (1), Haig-Thomas (2) and Reisser (3), but the features of the form have not been properly described. We were most interested, therefore, to find this butterfly not uncommon on the Veleta from 8000 ft. upwards. The males are small, expanding 14 mm. to 21 mm., with an average of 18 mm., and the fore wings are rather pointed. On the upper surface the shade of blue is variable, but usually slightly darker (more violet) and less lustrous than in ordinary Alpine specimens, and ab. *punctifera* is the rule. On the under-surface the ground-colour is cool grey inclining to brown, against which the white-ringed black dots stand out boldly. The sub-marginal orange lunules are paler and diminished, often almost absent on the fore wings, but the dark internervular marginal dots are regular and distinct. In general effect the markings stand out sharply without the diffused and indefinite appearance so often seen in Alpine specimens. The females are also small and dark, with traces of orange lunules on the upper-surface of the hind wings. On the under-surface the brown tone of the ground-colour is very decided.

This is clearly a well-marked subspecies, and most strangely I think it has been already figured and described by Hübner as *P. golgus* (figs. 688/689, 1808–1813). These figures agree well with my specimens, and the relevant text published in 1824 runs as follows: "Es gleicht dieses aus Spanien hergebrachte mannliche Muster dem P. g. Dorylas, doch ist es sehr klein und daher auch in allem sehr zart. Vielleicht lassen kunftige Erfahrungen naher bestimmen, was es eigentlich sein. Von Herrn Frank eingesandt."

In all important particulars the figures and data agree so well with my specimens that I feel Hübner's name *golgus* can be applied safely to this very distinct form. In the northern parts of the central Spanish plateau *hylas* occurs in the form *castilla* Fruhst., of which the typical male specimen is now in the British Museum. This is very close to *golgus* in size and colouring, but on the under-surface the distinctive features are less distinct. It is possible that *castilla* will fall as a synonym to *golgus*, but without an adequate series I cannot be sure of this. The species also occurs in the Asturias in a large form, much closer to the typical race of Central Europe.

P. nivescens Keferstein.—This insect was well out, and many specimens were already worn when we began to collect on June 20.

It was not very common in the Sierra de Alfacar nor in the Sierra Nevada, where we met with it at an altitude of 5000 to 6000 ft. The habitats of *hylas* and *nivescens* are therefore separated by about 2000 ft., but otherwise they fly at the same time and on the same mountain. The distinction between the two species has been fully considered by Reisser (3), who gives figures of the genitalia and of the imagines of both species.

P. escheri roseonitens Oberthür.—This species was flying by the roadside near Granada, and we took a few specimens also at about 5000 ft. in the Sierra de Alfacar. The specimens are large, and on the upper-surface the blue is paler than in examples from the Pyrenees and France. The black border to all the wings is narrow, as Oberthür pointed out when he described this form, which appears to be separable from typical *escheri* by constant characters.

Polyommatus escheri agenjoi forma nova.—At 8500 ft. on the Veleta we took a series of an unusual race in which the size is even more reduced than in *rondoui* Ob., from the Hte. Pyrenees. In the males of this series the wing expanse varies from 27 mm. to 30 mm. On the upper-surface two specimens show complete ab. *punctulata* Wheeler. On the under-surface the ground-colour is often dusky, the usual dark spots are well developed, and the post-discal series on the fore wing strongly emphasized in 2 males. The females measure 25 mm. and 27 mm. On the upper-surface the marginal orange macules are well developed. On the under-surface of the fore wing the disco-cellular and post-discal spots are relatively large, and form a striking feature. In this respect *agenjoi* differs greatly from *rondoui*.

I look upon this form as a modification produced by great altitude, and it should be classed therefore as *forma tempestatis*.

Holotype ♂, allotype ♀ in my collection, with 5 ♂ paratypes and 1 ♀ paratype, all from the Sierra Nevada, 8500 ft., July, 1947.

Lysandra bellargus Rottemburg.—A few specimens were flying in the Sierra de Alfacar, but I think we missed the first brood.

L. coridon albicans Herrich-Schaeffer.—Common in the Sierra de Alfacar, and seen on the road many times to the north of Granada.

Cupido sebrus Boisduval.—Worn specimens were taken in the Sierra Nevada.

Nomiades semiargus Rottemburg.—We took 2 specimens high up on the Veleta.

Cyaniris argiolus L.—Seen commonly here and there at lower levels.

Thymelicus lineola Ochsenheimer.—Common in the Sierra

Nevada at 5000 ft., but soon worn out. The specimens are very small and have been separated racially as *hemmingi* by Romei.

T. flava ibericus Tutt.—Common in the Sierra Nevada.

T. actaeon Rottemburg.—One specimen was taken in the Sierra Nevada, but probably the emergence was overlooked.

Ochlodes venata faunus Turati.—Local in the Sierra Nevada. (The more familiar *sylvanus* Esp. is not strictly available for this species.)

Carcharodus lavatherae Esper.—Local in the Sierra Nevada.

C. alceae Esper.—Two worn specimens taken behind the Alhambra.

C. boeticus Rambur.—Very common at lower levels. The colour varies a good deal, especially on the under-side, in the development of fulvous colour.

Muschampia proto Esper.—Very common, but many specimens were worn out.

Spialia sertorius Hofmannsegg.—A few large specimens were taken on the Veleta.

In addition to the above, a few additional species were taken near Burgos. These include *Coenonympha iphiodes* Staudinger, *C. arcania* L., *Pyrgus alveus* Hübner, *P. serratulae* Rambur and *Plebeius argyrognomon* Bergstr.

REFERENCES.

(1) RIBBÉ, C. (1909–1912), Beitrage zu einer Lepidopteren Fauna von Andalusien, *Iris*, Beihefte 1–4.

(2) HAIG-THOMAS, P. (1929), Two Trips to Central Spain and Southern Spain, *Ent. Rec.*, **27** : 29.

(3) REISSER, H. (1934), Beitrag zur Lepidopterenfauna des Rifgebirges von Spanisch-Marokko, *Eos*, **9** : 93.

(4) SAGARRA, J. DE (1925), *Butl. Inst. Catal. Hist. Nat.* (2), **5** : 204.

(5) QUERCI, O., and ROMEI, E. (1925), *Ent. Rec.*, **37** : 27.

(6) ZERNY, H. (1927), Die Lepidopterenfauna von Albarracin in Arragonien, *Eos*, **3** : 299.

Linkwood,
Woking.

SECOND BROOD EUROIS OCCULTA.—On the afternoon of October 18, 1947, I took a *Eurois occulta* in bred condition from an illuminated "Keep Left" sign at a busy road junction in this district. South (*British Moths*) only gives a summer emergence for this moth in the open, so it is possible that this specimen may be one of a second emergence. This is the first time I have taken *E. occulta* in Lincs.—J. H. DUDDINGTON; 5, Normandy Road, Scunthorpe, Lincs.

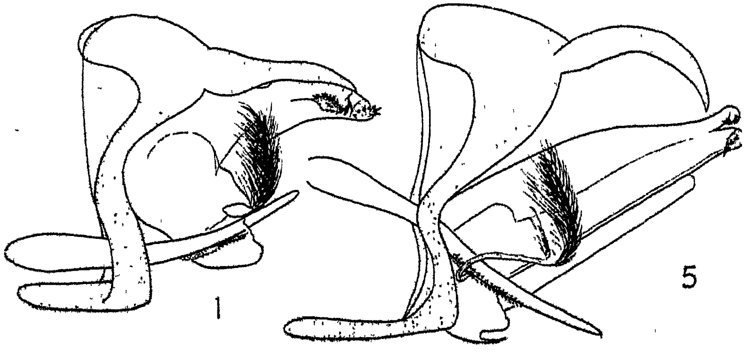
EUROIS OCCULTA IN N. YORKS.—As this insect is distinctly a rarity in Yorkshire, it seems worth recording that I took a female at sugar on August 26 in Jackson's Wood, Barnaby Moor.—N. W. HARWOOD; 37, Stoneyhurst Avenue, Acklam, Middlesbrough, Yorks.

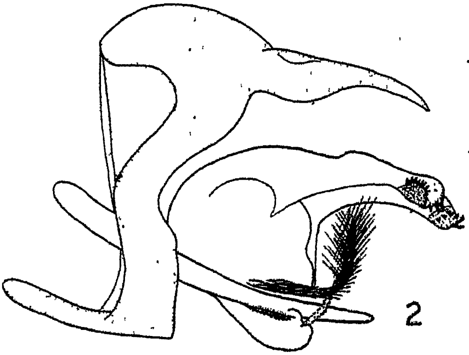
PAPERS ON MALAYSIAN RHOPALOCERA. V: THE CONSPECIFICITY OF THE AMERICAN *PRECIS LAVINIA* (CRAMER) WITH THE ORIENTAL *PRECIS ORITHYA* (LINNAEUS).

By A. Steven Corbet,
British Museum (Natural History).

While collecting butterflies in California in June, 1931, I was struck by the resemblance between the American Nymphalid *Precis lavinia* (Cramer) and the Oriental and Aethiopian *P. orithya* (Linnaeus) in manner of flight, habits and general appearance. I intended to investigate the genitalia of the two butterflies because I thought it highly probable that they were conspecific. A subsequent examination of the male genitalia left no doubt in my mind that these two *Precis* forms should be regarded as constituting a single species. Most of the larvae of the *Precis* species are similar in general appearance, although showing a high degree of individual variation, so that figures of the larvae are of little help in deciding for or against conspecificity.

Forbes (1947, *Entomologist*, **80** : 56–58) has recently examined the male genitalia of the "Buckeyes," as the *Precis* species are called in America, and come to rather different conclusions, but I think the appended figures will show clearly that *P. lavinia* should be regarded as a subspecies of *P. orithya*, and certainly not as a representative of the southern *P. villida* (Fabricius) as Eliot (1946, *Entomologist*, **79** : 225–228) suggested. It will be remarked that in both the American and the Linnaean butterflies the arrangement of the spines at the apex of the valva is similar and quite different from that found in *P. villida*. In America the sexes are similar in *P. lavinia*, and resemble the female of the Oriental and





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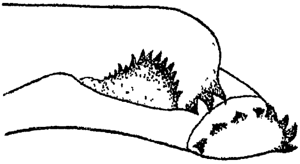

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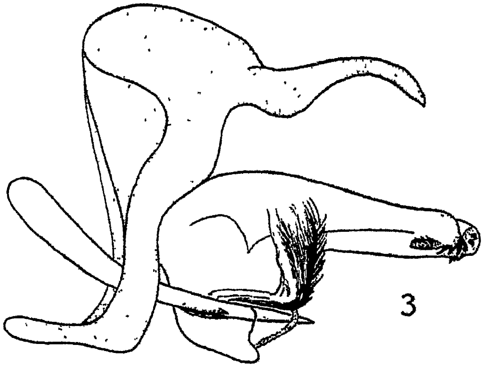

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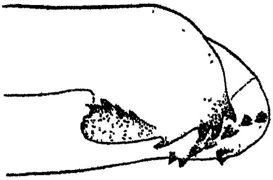

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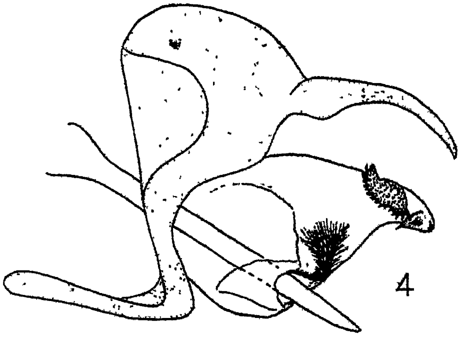

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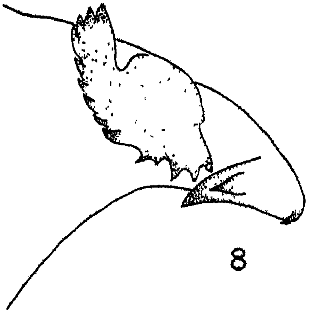

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FIG. 1.—Male genitalia of *Precis lintingensis*. FIG. 5.—The same of *Precis lemonias*. Both from Burma.

FIGS. 2–4, 6–8.—Male genitalia (right valva removed) of (2) *P. orithya* Malaya; (3) *P. orithya lavinia*, Florida; (4) *P. villida*, Australia. Enlargement of apical portion of left valva of (6) *P. orithya*; (7) *P. orithya lavinia*; (8) *P. villida*.

Aethiopian forms of *P. orithya*; in the Old World the male has the basal half of the fore wing black and the hind wing shining blue.

Although entirely different in appearance, *P. lintingensis* (Osbeck) (= *P. hierta* (Fabricius)) (see Corbet, 1945, *Proc. R. ent. Soc. Lond.*, (B) **14** : 94) has the same male genitalia pattern as *P. orithya*, and is certainly of the same origin. The distribution of the two butterflies, however, puts out of court any suggestion that the two may be vicarious forms. It is a curious fact that, in the Old World tropics, *P. orithya* flies with either *P. lintingensis* or *P. villida* (never with both) in all the land masses of any size except Formosa, Neomalaya, the Philippines and Celebes, and the Pacific Islands.

Besides *P. orithya*, the only other butterflies common to the tropical regions of America, Africa and Asia are *Vanessa cardui* (Linnaeus), *Zizula hylax* (Fabricius) (formerly known as *Z. gaika* (Trimen)), and *Hypolimnas misippus* (Linnaeus), but it is highly probable that this last-named insect was brought to America from tropical Africa in the days of the slave trade.

The distribution of the three *Precis* species mentioned in this paper, on the basis of the material in the British Museum, is as shown in the appended Table.

Table showing the Distribution of Precis *Species.*

	P. *lintingensis.*	P. *orithya.*	P. *orithya lavinia.*	P. *vellida.*
Africa, south of Sahara	×	×	—	—
Madagascar	×	×	—	—
Seychelles	—	×	—	—
Arabia	×	×	—	
Ceylon, India and Burma	×			
China				
Formosa	—	×		
Hainan	×	×	—	—
Indo-China	×	×	—	—
Malaya, Sumatra and Borneo	—	×	—	
Philippines and Celebes	—	×	—	—
Chagos, Christmas Is. and Cocos Is.	—	—	—	×
Java and Lesser Sundas	—	×	—	×
Moluccas and New Guinea	—	×	—	×
Australia	—	×	—	×
Solomons to Low Arch	—	—	—	×
Micronesia	—	—	—	×
N. and S. America	—	—	×	—

In the male genitalia of all the *Precis* examined, the inner margin of the valva lies close against the ventral edge of the uncus as shown in Fig. 1; Figs. 2 to 5 have been drawn with the valva moved away from the uncus in order to show the inner edge more clearly.

NOTES ON COLLECTING LEPIDOPTERA IN 1947.

By The Rev. F. M. B. Carr.

Since writing my last notes my long sojourn of thirty years in Cheshire and Lancashire has come to an end. On the last day of February I found myself installed in a new home that overlooks Poole Harbour and the Purbeck Hills. The abnormally long severe spell of cold weather continued for some days after my arrival. My first attempt at collecting was in the New Forest on March 7th, and there, to my surprise, I found *Erannis leucophearia* out in some numbers, also a solitary *Phigalia pedaria*. The weather during March became very wet, the experts reporting that in many parts of Southern England the rainfall was more than three times the average. It was nearly three weeks before I again ventured to the Forest. A few *Achyla flavicornis* and *Erannis marginaria* were the only species observed.

On April 1 *Gonepteryx rhamni* was fairly plentiful in the Forest. Three days later *Gymnoscelis pumilata* appeared at Sandbanks, and this was one of the commonest insects here throughout a succession of broods. April 7 was my last expedition to the New Forest till the end of the month. Besides *G. rhamni* a few *Ectropis crepuscularia* and *Nothopteryx carpinata* were noted, and also representatives of *Orthosia stabilis*, *O. cruda*, *O. gothica*, *Xylocampa areola*, *Erannis marginaria* and *E. leucophearia*. From April 11 onwards larvae of *Lasiocampa quercus* were exceptionally abundant on a rough heather-clad slope at Sandbanks. The broom was almost as freely patronized by them as the heather.

The next day I travelled to Chester, where I stayed the night with Mr. and Mrs. S. Gordon Smith before going on with them and Mr. B. B. Snell to Aviemore for an eagerly anticipated week. The journey from Chester was made in Mr. Gordon Smith's brake, which also accommodated his big lamp and all that pertains thereto. A halt was called by the way at the haunts of *Nyssia lapponaria*, and we were delighted to find the species out in fair numbers. A good series was obtained. Day collecting at Aviemore was not very productive. It was disappointing that *Endromis versicolora* failed to put in an appearance. A few larvae and cocoons of *Phragmatobia fuliginosa* var. *borealis* were found. *Brephos parthenias*, though fairly common, was worn. Other species encountered for the most part appeared in greater profusion after dark, attracted by the beams of the big lamp. The number of *Brachionycha nubeculosa* taken by this means was some compensation for the absence of *E. versicolora*. Five of us (Messrs. E. Bowser and R. Pilcher having now joined the company) were well satisfied with beautiful series of this handsome moth. Most of them were males, but a few females also came to the light. The other species attracted were *Achyla flavicornis* (common, some very beautiful forms), *Orthosia incerta* (common and very variable), *O. gothica* (including var. *gothicina*), *O. stabilis*, *O. populeti* (a few), *Conistra vaccinii*, *Xylena exsoleta*, *X. vetusta*, *Colostygia multistrigaria* (common), *Nothopteryx carpinata* (common and including very fine strongly marked forms), and *Lycia hirtaria* (of the handsome Highland form).

I returned home on April 20. A rather uneventful period followed, and several attempts on *Cleora cinctaria* in one of its New Forest habitats were unsuccessful. It was not till May 12 that I met with this species, and when it did appear it was very scarce indeed. Larvae of *Dasychira fascelina*, *Perconia strigillaria* and *Dyscia fagaria* were taken near Ringwood on May 6. Quite a number of the first-named species were taken right up to July 1, but all proved to be stung except two. On May 12 and subsequent dates I worked hard in the Forest for *Ectropis consonaria* and managed to get a few. *Pachycnemia hippocastanaria* was also taken.

During May and June several larvae of *Lasiocampa trifolii* were taken near Swanage and Wareham. On May 20 *Argynnis euphrosyne* was out rather sparingly in the New Forest.

Towards the end of the month *Nola confusalis* was about in some numbers on a row of evergreen oaks at Sandbanks, but I first saw this insect in the New Forest as early as April 29.

A visit to Salisbury on May 27 produced a fair number of *Bapta bimaculata* and *B. temerata* and a number of half-grown larvae of *Malacosoma neustria*. The next day near Wimborne *B. bimaculata* and *B. temerata* were again found, also *Eilema sororcula*, a short series of *Mesotype virgata* and a web of small *Eriogaster lanestris* larvae. A flying visit to Lulworth on May 29 gave me my first sight last season of *Colias croceus*, a large female in such fine condition that it was difficult to believe that she had travelled across the sea. A few *Aspilates ochrearia* were also observed.

My greatest surprise and disappointment this month was the finding and losing of a fine *Hadena albimacula* at rest on a post on the Dorset coast. The moth slipped away whilst I was trying to box it. Larvae taken in the New Forest on May 30 included a full-grown *Argynnis paphia*. This was spotted at a height of about 7 ft. on a beech trunk. It pupated the next day and produced a strangely asymmetrical male. Other larvae included *Zephyrus quercus*, *Polyploca ridens* in some numbers, and *Orthosia miniosa*. Towards the end of May a heat wave set in and the truly wonderful summer of 1947 had begun.

Lysandra bellargus was beginning to appear at Lulworth by June 2, and a nice *Boarmia punctinalis* was taken from a telegraph post. A couple of *C. croceus*, a few *Vanessa cardui* and several *Cupido minimus* were seen the next day on the Purbeck Hills. On June 4 I joined Messrs. Gordon Smith and Basil Snell in the New Forest. A single worn *Hamearis lucina* was seen, also *Cepphis advenaria*. Larvae included *Polyploca ridens*, *Brachionycha sphinx*, *Orthosia miniosa*, *Ennomos quercinaria* and *Biston strataria*. On June 6 several males of *Parasemia plantaginis* were disturbed near Swanage, and the next day a fine female *Arctia villica* was found by Mr. Gordon Smith, whilst we were pursuing *Lysandra bellargus* and *Cupido minimus*.

On the evenings of June 7 and 9 I joined Messrs. Smith, Snell and Bowser round the big lamp in the New Forest. Business was fairly brisk, the less common captures including 1 *Notodonta anceps* (*trepida*), *Eilema sororcula* (several), 1 *Nycterosia obstipata*, *Plagodis dolabraria* (a few), *Boarmia punctinalis* (several), and *Ectropis consonaria* (a female).

On June 9 we all went in quest of *Melitaea aurinia* to the Blandford locality. It was plentiful enough, but individuals in good condition were rather hard to find. *Hamearis lucina* was also past its best. Other species encountered included *C. croceus*, *C. minimus*, *Macroglossum stellatarum*, and a few nice fresh *Procris geryon*. On June 11 Mr. Bowser drove me to Horsebridge, where we drew rather a blank, the only noteworthy captures being a single *Eustrotia uncula* and a few *Rivula sericealis*. The next day we went to the Isle of Wight for *Melitaea cinxia*, but were too late. Only four were seen, and the one netted was worn. Three females of *Arctia villica* were taken. Little was seen on the 13th at Lulworth, though larvae of *Cucullia verbasci* were common on mullein, and I took one *Acasis viretata*. Mr. Bowser and I found *Perconia strigillaria* plentiful amongst the heather near Ringwood on the 16th. The males were large and variable and in beautiful condition. Females were scarce. We also got 20 larvae of *D. fascelina*.

On the 17th we went in the Wareham direction. Here we found *Argynnis selene* very plentiful. I was lucky to net a fine male variety, heavily suffused with black. This was easily discernible while the insect was on the wing. *Plebejus argus* was just emerging. Other species included *Diacrisia sannio*, *Cybosia mesomella* and *Chlorissa viridata*. The next two days we spent in exploring adjoining heaths, and obtained more *C. viridata*, *Sterrha subsericeata*, *Semiothisa alternaria*, *Dyscia fagaria*, and larvae of *L. trifolii* and *D. fascelina*.

On June 23 Mr. Bowser and I spent some time collecting larvae of *Orthosia gracilis* from bog myrtle in the New Forest in the hope of breeding the red forms. We found *Limenitis camilla* out, and single examples of *Argynnis paphia* and *A. adippe*. Later *L. camilla* abounded, and so, though locally, did *A. adippe*, but in my experience it was the worst season ever for *A. paphia*, and though I worked doggedly for a few var. *valezina* I failed to get one worth keeping, and indeed the number of females seen at all was very small. A few larvae were taken on the 23rd, and included *Drymonia ruficornis* (*Chaonia*), *Clostera pigra*, *P. ridens* and *B. strataria*. On June 28 I boxed a nice *Polia nebulosa* var. *pallida* in the garden. On the last day of the month I took a few *Miltochrista miniata* and a fine female *Boarmia roboraria* in the New Forest, and single larvae of *N. anceps* (*trepida*) and *D. ruficornis*.

On July 7 a search for *Hyloicus pinastri* in the Wareham neighbourhood was unavailing. Single examples of *Laspeyria flexula* and *Mysticoptera sexalisata* were beaten.

By July 11 *T. quercus* was out in the New Forest. At Corfe Castle on July 14 both sexes of *Melanargia galathea* abounded and there were a few *Thymelicus acteon* about. On the 16th I was again in the Wareham area, with Mr. D. Boyes. This time we succeeded in finding *H. pinastri*, of which Mr. Boyes took a pair and I a single. The next day I took two more near home. My fourth and last capture of the species was a large female, also in this neighbourhood, on August 1. Mr. Boyes and I visited the Swanage area on July 18 for *Lysandra coridon*. We found the species already in great numbers, chiefly males. This butterfly continued in astonishing profusion for several weeks, and occupied much of my time. The size tended to be large, but I also took several dwarfs, the smallest male being about the size of an average *P. argus*. I am not acquainted with many of the varietal names, but several nice underside varieties were taken, showing diminished spotting or united spots. Male uppersides varied greatly in shade, and in the width and intensity of the black border. One male has orange spots in the hind wing border. Female uppersides call for little comment, but one has a curious little patch of male coloration on the right fore wing.

I took *Eilema deplana* in the New Forest on July 22. *T. acteon* was in fair numbers in the Swanage area by July 23, the second brood of *C. minimus* was appearing and half a dozen *C. croceus* were seen. This species increased in numbers, and was plentiful throughout the rest of the summer and autumn. My latest record for it was November 8 when, rather late in the afternoon, I started up several at Southbourne. A remarkable percentage of those seen in the earlier part of this period were females. I attempted for a short time to estimate the percentage of var. *helice*, but found it difficult. However, for what it is worth, I counted during this period 119 females, of which 9 were the variety. Later in the season I concentrated my attention on var. *helice* and took some very beautiful forms, ranging through peach colour, primrose and the more usual cream to the white var. *pallida*. The more extreme examples of the last-named have the central blotches on the hind wings cream instead of orange. The spotting in the black margins of the fore wings varies from very pronounced to almost absent, but I failed to find a true var. *obsoleta*. In the yellow females I took two, with markedly paler costal area, and two of a very "unripe" orange shade. Of the males taken the largest measures 50 mm. in wing expanse and the smallest 38 mm. There is a lovely lemon-coloured male, with very green costal and hind wing suffusion, and another of a peculiar pale dull buff. I kept one var. *helice* on August 9 for ova. These were deposited on the 10th and 11th. Unfortunately I lost most of the larvae in their first stage. The ova hatched on August 16, first pupa September 2, first imago September 13. Total 5 males, 3 females (all *helice*). One female has the pale cream-coloured blotches on the hind wings. This small brood, though perfect, is very undersized.

On July 25 I went to one of the New Forest heaths for *Selidosema plumaria*, but only took one, a male. I took a bred female of *Lasiocampa quercus* with me, and put a spare net over her on the heather. The first male arrived while I was securing the net, and altogether about 70 males were attracted. On August 12 near Swanage I netted *Heliothis peltigera* as it darted about from one flower to another in the sunshine. It was most difficult to follow with the eye, but I was lucky. *Vanessa cardui* was very plentiful during the late summer and autumn, and particularly during September and October, showing a great fondness for the Michaelmas Daisies in gardens. *Macroglossum stellatarum* abounded at the same time. I found the second brood of *Lysandra bellargus* out on August 13.

Larvae of *Sphinx ligustri* were common at Sandbanks. On September 3 a full-grown larva of *Herse convolvuli* was brought to me. This soon pupated and a female emerged on October 22, after four days' forcing. During late August and September I kept an eye on the specially grown Nicotiana in the garden, but began to despair of taking this species at it. It was not till September 12 that I got my first moth. This was a very fine female, resting on a post a few yards from this house. Then things began to happen. The following day I took a male from some near-by palings, and in the evening of the same day a second male at my Nicotiana. On September 15 I netted a male and a female at the tobacco flowers. But at this promising stage operations were brought to an abrupt ending, for in the early hours of the next morning I was hurried off in an ambulance to hospital, and on my release ten days later no more *H. convolvuli* were to be seen.

Lycaena phlaeas was hardly seen till September, but then it appeared in fair numbers, though never abundantly. Captures included a very much suffused male, and some nice blue-spotted individuals, one of which has a pale left fore wing.

Autumn "treacling" in the garden was no good, producing little but an occasional *Peridroma porphyrea* (*saucia*) and *Scoliopteryx libatrix*. In the late autumn I made a few pupa-digging excursions, mainly to the New Forest. On one of these (November 13) *Brachionycha sphinx* was taken. More than 400 pupae rewarded my "excavations." By their size I guessed that a large proportion of them would prove to belong to the *Erannis* group. This has not been far wrong, as up to December 11 129 *E. aurantiaria* and 19 *E. defoliaria* have emerged. Of the 129 *E. aurantiaria* 94 have been females! My first attempt at an explanation was that there had been a considerable emergence of males before I started digging, but this seems to be rather discounted by the fact that, although 254 of the pupae were dug by October 21, no emergence took place at all until November 5. This pupa-digging is a curious business, for 78 pupae were dug from one tree and 53 from another, whilst neighbouring and apparently equally promising trees would produce nothing at all or only one or two pupae. Light, mostly the house light, was good at intervals. Nothing appeared until June 10. Then came a short spell of fairly good nights. In mid-July there were some very productive nights, and again from August 8 to 24. The autumn was disappointing. *Nycterosea obstipata* (*fluviata*) deserves first mention. Of this species I took 6 males and 3 females. Five of the males appeared in mid-August, and the other on November 23. The females came on September 2 and 6 and November 8. Amongst other visitors to light were *Cerura hermelina* (1), *Habrosyne derasa*, *Thyatira batis*, *Dasychira pudibunda*, *Philudoria potatoria* (including a male with much female coloration), *Poecilocampa populi*, *Miltochrista miniata*, *Eilema griseola* and two var. *stramineola*, *E. lurideola*, *Cryphia muralis* (1), *Agrotis vestigialis* (1), *A. clavis* (*corticea*), *A. puta*, *Euxoa cursoria* (1), *E. tritici*, *Lycophotia varia* (*strigula*), *P. porphyrea* (*saucia*), *Amathes c-nigrum* (the most-abundant Noctuid), *Hadena suasa* (1), *H. trifolii*, *H. serena*, *Thalpophila matura*, *Apamea ypsilon* (*fissipuncta*) (1), *B. sphinx* (1), *Hydraecia paludis*, *Gortyna ochracea* (1), *Nonagria geminipuncta* (1), *Arenostola phragmitidis* (1), *Rhizedra lutosa* (1), *Leucania pudorina* (1), *Caradrina morpheus*, *C.*

alsines, *C. blanda*, *Jaspidia pygarga* (*fasciana*), *Plusia festucae* (1), *Abrostola tripartita*, *Laspeyria flexula*, *Schrankia taenialis* (*albistrigalis*), *Hemithea aestivaria*, which vied with *Cleora rhomboidaria* for first place as the commonest Geometer, *Scopula marginepunctata*, *S. imitaria* (1), *Calothysanis amata* (common), *Chesias legatella* (*spartiata*), *Acasis viretata*, *Thera firmata*, *Euphyia unangulata*, *G. pumilata* (common), *Gnophos obscurata* (1), *A. ochrearia*, *Ellopia fasciaria*, *Semiothisa alternaria*, *Deuteronomos alniaria*, *Colotois pennaria* and *Pachycnemia hippocastanaria*.

The Croft,
Shore Road, Sandbanks,
Bournemouth.

ABUNDANCE OF LEPIDOPTERA IN 1919.—With reference to Mr. Blackie's remarks on the abundance of butterflies in 1919 (*Entom.*, **80** : 256), I perhaps did not make it sufficiently clear that the diagram indicating the seasonal abundance of the Lepidoptera (*Entom.*, **80** : 50) refers to the Lepidoptera as a whole, not merely to the butterflies. As I stated, in every year of general scarcity there was always a minority of species which were abundant. In 1919 most of the butterflies seem to have been included in this minority. Judging from published records, only the common Pieridae and Lycaenidae seem to have been scarce generally in that year. Referring to the Lepidoptera as a whole, the season of 1919 was variously described in the entomological periodicals at the time as being " slightly below the average." " disappointing," " undoubtedly bad," " one of the worst on record," etc. Statements on the abundance of the Lepidoptera ranged from " not numerous " to " very scarce " and " great scarcity."—BRYAN P. BEIRNE ; Trinity College, Dublin.

IMMIGRANT SYMPETRUM (ODONATA) IN N.E. HANTS IN 1947.—*Sympetrum flaveolum* turned up singly at Fleet on August 4, and at Frensham Little Pond on August 13, whilst six specimens were met with at Kingsley on August 15. All were males. Of *Sympetrum fonscolombii* two rather worn males were found at Frensham Great Pond on August 13. The species occurred here and at Fleet in 1946 (*Entom.*, May, 1947), but Fleet Pond was drained during the winter of 1946–7. The absence of records for 1947 other than the two at Frensham points to their being native specimens. I reared a single female *S. fonscolombii* on July 24, 1947, from ova obtained from a Fleet specimen of the previous year. *Sympetrum sanguineum* is always present, being resident on the Basingstoke Canal, but in 1947 it turned up at both Kingsley and Fleet Ponds commonly and a single specimen was found at Frensham Little Pond.—A. W. RICHARDS ; " Nether Edge," Hawley, near Camberley.

SOME NOTES ON THE HABITS OF BUTTERFLIES.

By Lt.-Col. Nevill Eliot, C.B.E.

From about 11 a.m. to 2 p.m. G.M.T. on 11 days between March 26 and the end of April, 1947, I sat in a wheeled chair at a spot whence could be seen all of the quarter-acre plot formed by two sunny south-looking terraces nicked out of a steep scrub and tree-covered slope above the Mediterranean Sea. The upper terrace, once a small quarry, is backed by a vertical rock-face rising to over 20 feet, and a broad steep bank separates it from the one below. This plot of ground is not so much a garden as a slight improvement on nature. The jumble of plants it contains, many indigenous, are those which have survived the war, either as bulbs or bushes, or as self-sown annuals, and their flowers produce a changing patchwork of colours, in which blue is predominant, and red least represented. A red-flowered *Bignonia* climbs the quarry face, while behind a low wall at the far end are grouped a clump of scarlet geranium, a patch of deep yellow wild marigold and a recumbent rosemary (light blue), with blue periwinkle beyond in a corner where a pink-mauve Valerian overhangs a stretch of white *Omphalodes*. Both terraces carry, besides other plants, great straggling bushes of French lavender, recumbent rosemary, many small bushes with bright blue daisy flowers, mauve *Mesembryanthemum*, yellow jasmine and *Cistus albidus*, whose mauve-rose petals fall before sunset on the day of their unfolding. A path, striking diagonally down the bank, has a few red and other self-sown anemones among its dandelions and small yellow crucifers, and is lined, at its far end, by a mass of bright yellow *Oxalis cernua*: while on the bank itself creamy-white freesias are so profusely naturalized as to drench the plot with scent on calm sunny days. Over all this spread of colour and aroma there is, while the sun shines, great traffic of butterflies, much flitting from flower to flower and bush to bush, and busy feasting.

Watching this lively assemblage, which during the earlier part of the period may have consisted of over 20 individuals at a time, of 8 species or so, produced no evidence that any one species did not see and discriminate colours as well as I did, nor that given plenty of choice under more or less natural conditions, any species had a preference for a particular colour merely as such. Rather the evidence pointed to the insects knowing, by instinct, or more probably by experience, what flowers were rewarding; and it may be presumed that in the subsequent recognition of such flowers colour played its part. There was but slight evidence of any individual keeping to a particular variety of flower, as it has been said bees do.

Some plants were completely ignored, however closely approached, although they must have been seen. Examples are a white-flowered tree-heath (*Erica arborea*), a small mimosa (*Acacia* sp.), whose little fluffy yellow balls presumably offer no nectar, and a South American monocotyledon (? *Antholiza*), with long red scimitar-shaped flowers. Of these three the last was the only one ever seen to be visited—by an *argiolus* on two occasions.

Gonepteryx cleopatra has the least restricted tastes; it fed on all the flowers mentioned above except the ignored three, but did not seem to find either *Omphalodes* or *Mesembryanthemum* particularly attractive. It is the only species seen on the red *Bignonia* and on a fleshy-leaved plant with pendant tubular red flowers. At the group of flowers behind the low wall a male fed for some little time on the scarlet geranium flower-heads, flew to the rosemary and fed, returned to the geranium and fed, passed on to the marigolds, fed and flew out of sight. A female seen on rosemary flew straight to a red anemone on the path and then on to the freesias. A solitary *Iris tingitana* (blue and yellow) was visited on the day it opened, first by a male and later a female. Another male flew from marigold to yellow jasmine and thence to rosemary and rosemary feeding at each.

Colias croceus, while not so avid, is nearly as broad-minded as *G. cleopatra*. One flew to the end of the upper terrace and back, but only settled on a red anemone. Another also settled on the same relatively scarce flower. Generally, however, the more numerous blue and yellow flowers seem preferred to red or white, although a *croceus* was seen to fly from one patch of freesias to another without taking any notice of the bright yellow crucifers in between. The mauve lemon-scented geranium bloomed towards the end of the period, when the number of butterflies was decreasing. At one small clump were seen feeding simultaneously two Bee hawk-moths, a *Papilio podalirius* and a *croceus*.

Pieris brassicae seems also nearly as easy to please as *cleopatra*, compared with which it showed a slight preference for the mauve *Cistus*, and, among the blues, for periwinkle. The two species seemed equally attracted by yellow jasmine and *Oxalis*. *Brassicae* was seen both on the scarlet geranium and a pure white flower.

Euchloë crameri Butler (=*belia* Cramer, Linné) is a restless fast-flying little butterfly that showed some slight preference for rosemary, lavender, yellow *Oxalis* and wayside weeds. One, after closely inspecting some freesias, settled on a small crucifer. I have no record of it on a red flower.

Anthocharis cardamines.—When this species started to fly females were either invisible or non-existent, and the male seemed indefatigable in its anxious quartering of the ground. The first individual seen feeding was a few seconds on a small yellow pea (*Lathyrus* sp.), and another was seen later on a clump of blue daisy. Finally a very eager feeder was watched on the same mauve lemon-scented geranium mentioned above and below. Disturbed, it flew to a similar clump a few yards away, but soon returned without being deviated in the least by an intervening *Mesembryanthemum* of very similar colour. These were males.

Papilio podalirius was seen on all colours except red. Two on the upper terrace simultaneously were watched for nearly half an hour. One individual, between short elegant flights along the terrace, fed persistently on the same clump of mauve valerian, except for one brief visit to a small valerian high up the quarry face. The other as persistently haunted the two clumps of mauve lemon-scented geranium, except for a few seconds on a white *Omphalodes*. It seems that each insect had found and remained constant to a particular locality where food was plentiful and appetizing. *Podalirius* often adopts a particular bush or small tree and returns time and again to perch on its branch ends. *Cleopatra* was little endowed with this quality of constancy.

Cyaniris argiolus has been mentioned as the only species feeding on *Antholiza*. Another plant also neglected by larger butterflies is *Grevillea rosmarinifolia*, possibly because its rosy-red flowers are awkwardly set in a defence of narrow pointed leaves; but it is popular with bees, the Bee hawk-moth and *argiolus*. Lavender and mauve *Cistus* were also appreciated. Incidentally, neither the Humming Bird nor the Bee hawk-moth appears to have any colour preferences.

Hibernated *Nymphalis polychloros* was conspicuous in never being seen to feed.

Pararge megera is a restless creature, zigzagging close to the ground, on which it settles frequently but briefly. It was rarely seen on flowers; one individual was seen to inspect two red anemones without alighting, a second was seen on a blue daisy, and a third visited a succession of dandelions along the path.

When alighting to feed on flowers, and probably for most other purposes, *cleopatra* and *croceus* close their wings with a snap and keep them shut. *Argiolus* feeds with closed wings, and *brassicae* with wings sometimes shut and sometimes open. With the other four species mentioned, not counting *polychloros*, the open-winged attitude seems normal when feeding or, in one case, basking in the sun. This one exemplar of basking with wings open is *megera*. Twice a *megera* settled so close to me that I could see it orient itself directly away from the sun. This would seem to be the natural position to take up with open wings in order to receive most warmth from the sun's rays. Incidentally, in this position the insect can see clearly ahead, while danger approaching from behind will cast its shadow before.

On the other hand, if a butterfly which habitually keeps its wings closed when at rest wishes to bask, its natural and most effective attitude would be broadside to the sun and canted away from it so as to expose as much of the body as possible. It is suggestive that this attitude was adopted by the only other butterfly seen apparently sun-basking, *C. croceus*, which settled on a bare patch on the path close to me. A number of small dandelions grew nearby, and there was a striking resemblance in tint and brightness of colour between the flower and the butterfly thus stationed, with its wings well rounded up. Very probably I should not have noticed it had I not seen it fly in and alight. Thrice thereafter *croceus* was seen to settle in much the same attitude, as far as could be observed at the greater distance, on bare earth, where the nearest yellow flower was a couple of yards distant, or more.

No doubt habit generally precedes procrypsis and not *vice versa*. If it is the manner in which a settled butterfly habitually carries its wings by day, coupled with the desire for warmth, that determines the attitude it takes up for basking, then it is entirely fortuitous that, with an approximately broadside-on stance with wings canted, the amount of shadow visible should be greatly reduced. But if that reduction of shadow were of value in concealment, Natural Selection might then step in and enhance the benefit by strengthening instinctive adherence to the attitude and perfecting the procryptic coloration. In *Entom.* **79** : 19 it is suggested that the yellow or white *Gonepteryx rhamni* may, for protective concealment, have developed an instinctive preference for yellow and white flowers. But this hardly seems likely, as it might appreciably handicap the insect in its search for food. On the other hand, if dandelion-yellow is a reasonably common flower colour in the range of *croceus*, then the colour of its undersurface may often be beneficial but can rarely be harmful. The only other Pierid seen at rest on bare ground was a female *cleopatra*, on a damp shady pathway; but this was no more sun-basking than were three *Leptidea sinapis* seen (before the war) on wine-tainted mud outside a cellar door.

An interesting feature of the courtship preliminaries of *G. cleopatra* is that throughout the whole time the male is fluttering near, or with, the female he keeps just below her. These dances were best performed on those days of golden sun and warm calm when they were first watched. Later performances seemed rather perfunctory, perhaps because of a cool breeze one day, or haze another, or some other reason. The first pair seen were fluttering together towards the far end of the top terrace ; arrived there they soared fluttering vertically upwards, the male just below the female and seeming to boost her up on his shoulders. When they had risen about 10 feet the male suddenly ceased to flutter, held his wings widely open and parachuted slowly downwards. When between 1 and 2 feet separated the partners the female hurriedly rejoined the male and they dropped down together and were lost to sight among the herbage. This dance was repeated by several pairs and, judging by appearances, it is the sight of the beautiful yellow and orange male floating below her that lures the female to consummate the union ; but if so, it is only the final lure, for in Dr. E. B. Ford's *Butterflies* it is stated that the male *cleopatra* has a " strong scent of freesia, rich and powerful " : and the position taken by him close below the female would no doubt be favourable, particularly if on hot calm days upward currents of air helped to waft the stimulating scent to the female. The male *G. rhamni* has no scent (*ibid.*), and it would be interesting to know how this affects its courtship play.

I saw this dance again frequently, but always with a disappointing finish. On one occasion a female was feeding on a mauve *Cistus* towards which a male happened to make his way. After feeding on two or three flowers he suddenly perceived the female not a foot away and flew at her, whereupon both insects started to flutter. After a few seconds they fluttered obliquely upwards, rising some 7 feet in five seconds. The male parachuted, was joined by the female and both descended, but only to flutter together for a few seconds and part. Another female, clinging to a crucifer, opened her wings wide and lifted her abdomen when a male started to flutter below her. Soon they were fluttering in company, but when he parachuted she returned to her crucifers. The male, having parachuted from a low height and with little caution, appeared to fall into an awkward tangle of vegetation, but extricated himself, searched for and found the female and recommenced fluttering at her. This comedy was repeated four times again before the discomfited aspirant departed to seek more congenial company. Another male, after fluttering for 75 seconds at an obdurately immobile female on valerian retired in disgust, and was misled first by a *brassicae* and then a *crameri*. It soon returned to the valerian, but only to feed. Any white or cream butterfly was apt to mislead the *cleopatra* male ; a *podalirius* drew one the length of a terrace ; but in compensation the male *cleopatra* often misleads *croceus*.

On one occasion a female *cardamines* was noted on the ground, wings spread open. Almost immediately a male appeared and started fluttering just above her. In a few seconds she flew a foot or so to a crucifer and took up the same attitude some six inches above ground level. The male having followed, continued to flutter above her. Presently they darted upwards and passed out of sight gambolling together. The direction the light came from made further observation difficult, but apparently the male did not keep to any fixed position relative to the female.

To close these notes I would like to be able to describe adequately what seemed to be some strange insect with iridescent wings, a dragonfly perhaps, that suddenly appeared from behind me and flew along the terrace at just about the same level as my eyes, in a quiver and shimmer of blue light. It disappeared at the far end, leaving me mystified and wondering, but soon returned along the same line, with the same blue sheen. As it neared me it rose above eye-level, turned somewhat aside and revealed itself as the to me familiar Continental White Admiral (*Limenitis rivularis* Scopoli), which in its swift flight glides over considerable spaces with its blue-glossed wings held horizontally.

Bonporteau,
Cavalaire, Var, France.

NOTES AND OBSERVATIONS.

SECOND BROOD ARGYNNIS SELENE.—Whilst collecting on the South Downs near Steyning, Sussex, on August 24, I was surprised to encounter two male *Argynnis selene*, one worn, the other quite fresh and apparently newly emerged, feeding and flying about the blossoms in a lucerne field some 200 ft. above sea level in an open, dry and hot situation. The nearest woodlands are five miles away, and the nearest locality for the species known to me is still further off. The insects were flying amongst *Pieris brassicae*, *P. rapae* and *Colias croceus*, and a solitary fresh male *Colias hyale* was taken in the same field.—G. HAGGETT; 1, Torton Hill, Arundel, Sussex.

SECOND BROOD OF MELITAEA ATHALIA.—On visiting the well-known Essex locality for this insect on August 24 I noticed half a dozen newly emerged specimens on the wing. Subsequent visits confirmed that there has been a fairly large second brood this year. To-day (September 4) at least two dozen absolutely fresh insects were on the wing. They all, both males and females, appeared to be rather small. In twenty-five years' experience of the butterfly I have never known a second brood before, and I see that Frohawk considers it single brooded.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

SECOND BROOD LIMENITIS CAMILLA.—While collecting in a large area of commonland near Upton-on-Severn on October 5, 1947, I netted an undersized male of *Limenitis camilla.* The specimen was fairly fresh except for worn fringes. Its size indicates the probability of belonging to an underfed second brood, but it may be a delayed emergence of the normal single brood.—K. G. SMITH; 47, Delamere Road, Hall Green, Birmingham, 28.

On September 15 I saw, but was unable to catch, a newly emerged White Admiral, which was sitting and floating round a honeysuckle-laden whitethorn bush just out of reach. A worn *Lygephila pastinum* came to my light trap on September 20. Also a *Lampra fimbriata* came to the trap on the 7th, which must be a second brood.—JOHN HOWELL; Lychwood, Worplesdon Hill, near Woking.

Limenitis camilla was first observed here in a wood (see *Entom.*, **80** : 115) on June 22, about a fortnight before the previous two years' dates. This unusually early emergence seems responsible for a partial second brood, for in the same wood I saw the butterfly in a fair condition on September 20. Unfortunately I did not get a chance to look for any more.—ANDERSON McCLELLAND; Farfield, Holt, Norfolk.

I to-day (September 4, 1948) saw two newly emerged *Limenitis camilla* on the wing; I captured and released one, a perfect male in fresh condition.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

On September 28 a fresh *Limenitis camilla* was seen in this district. —G. M. HAGGETT; 1, Torton Hill, Arundel, Sussex.

Whilst walking in Ongar Park Wood, Essex, on September 16, I was surprised to see a *Limenitis camilla* in good condition, feeding on over-ripe blackberries in company with *Vanessa atalanta* and *Polygonia c-album.*—W. A. SANDS; 26, Leigh Road, Leyton, E. 10.

To-day, at Scratch Wood, near Elstree, I took a female *Limenitis camilla* and observed another on blackberry. What a summer!—HARRY E. WEBB; 20, Audley Road, Hendon, N.W. 4, October 1. 1947.

I have seen three *Limenitis camilla* during this present month. On September 1 a perfect specimen was noted sunning on edible chestnut; on September 6 a very fair specimen was seen flying in my garden, and another on September 22.—D. COX; "Edale," Ipswich Road, Colchester, Essex.

SECOND BROOD LAOTHOË POPULI.—On Sunday, July 27 last, I was given three *L. populi* larvae which had fed on willow. On July 29 one pupated, and by August 2 the other two had done the same. On August 8 a male emerged, presumably from the first pupa, *i.e.* in less than two weeks. A female emerged on August 21. The third has remained a pupa. Both moths are pale in colour, the female particularly so, being a pale buff shade.—W. G. GARDINER; 141, Raeburn Avenue, Surbiton, Surrey.

Five larvae of *Laothoë populi* taken on poplars at Lee pupated in August and September. The last two to pupate emerged and copulated on the evening of September 26, the female producing fertile ova from which larvae are being reared.—P. A. LANKTREE ; 3, Sydney Place, S.W. 7.

A freshly emerged male *L. populi* was found to-day (November 8, 1947) in this city and brought to me.—C. GRANVILLE CLUTTERBUCK ; 23, Heathville Road, Gloucester.

NYMPHALIS ANTIOPA IN KENT.—On the morning of August 28 an eight-year old boy observed what he thought was a White Admiral on some *Buddleia* in his garden. He quickly fetched his butterfly net and caught it. He gave the specimen to his father, who correctly identified it as a Camberwell Beauty. I have recently been shown this butterfly, and there is no doubt about its identity. It has a white border and is in excellent condition. It was next door but one to this house that a 17-year-old boy secured an *Argynnis lathonia* in the greenhouse towards the end of July, 1946. This boy also caught a *Papilio machaon* in the evening about the middle of August, 1946, in a nearby cornfield on the cliffs. On August 20 this year my brother observed another *P. machaon* flying along the breakwater of Dover Harbour towards Folkestone. He was engaged in setting up his fishing gear when it appeared, and therefore was too late in trying to catch it.—DAVID W. MOBSWORTH ; " Kestrels," St. Margaret's Bay, Dover, September 5, 1947.

NYMPHALIS ANTIOPA IN FEBRUARY.—In the *Somerset County Herald* for February 14 it is reported that Mr. J. Kelway, of Langport, found a living Camberwell Beauty on a window in his house on February 10. It is now in the Somerset County Museum. It is normal for the species to hibernate as a butterfly, but there can be few records of its doing so in this country.—ED.

PONTIA DAPLIDICE IN E. KENT.—On August 3, 1947, I took one worn specimen in a stubble field in the Isle of Thanet.—G. E. L. MANLEY ; Whales Farm, West Chiltington, Sussex.

PONTIA DAPLIDICE IN HAMPSHIRE.—On September 9 I captured a perfect Bath White in a field near Bournemouth.—P. HACKETT ; 31A, Woodside Road, Southbourne, Bournemouth.

HYLOICUS PINASTRI IN BOURNEMOUTH.—*Hyloicus pinastri*, which has been very common in Bournemouth for some years past, is now, I fear, becoming scarce again, probably due to over-collecting, as it has been much sought after, especially by small boys, who take all they find and kill many wantonly.—A. T. POSTANS ; " Broadmayne," 13, Stanfield Road, Winton, Bournemouth, September 12, 1947.

HYLOICUS PINASTRI IN THE ISLE OF WIGHT.—I took a worn female *H. pinastri* at rest on a pine trunk in the Isle of Wight on July 14 last, and reared four larvae from the five eggs she laid. A fresh male was also taken in the same area on that date by another collector.—E. C. HOLROYD ; 8, Elmside, Guildford.

HELIOTHIS PELTIGERA IN SURREY.—With reference to Baron de Worms' note (*Entom.*, **80** : 234), it is perhaps of interest that I took a *Heliothis peltigera* on the outskirts of Guildford on August 15 last year.—G. C. Holroyd; 8, Elmside, Guildford.

Laphygma exigua and Nycterosea obstipata (fluviata) in N.W. Kent.—On August 19, some time after midnight, I found a fresh *L. exigua* at rest by an electric light at the railway station here. Five days later, at 1 a.m. on August 24, near the same light was a male *N. obstipata*; Mr. L. Christie was able to confirm its identity.—Eric Evans; Petts Wood, Kent.

Migrant Lepidoptera in W. Sussex.—August, 1947, showed welcome signs of migrant activity in Sussex. I captured a fresh male *Nycterosea obstipata* (*fluviata*) on the 16th near Hurstpierpoint, a fresh male *Rhodometra sacraria* in a clover field near Fittleworth on the 22nd, and a good male *Laphygma exigua* at Angmering (at light) on the 25th. I was also present when my son captured a freshly emerged male *R. sacraria* on grass in a wood near Graffham on the 29th. Both specimens of this insect had superb pink stripes on the front wings. Other migrant species, especially *Vanessa atalanta*, *V. cardui* and *Macroglossum stellatarum* were all abundant this month.—Cmdr. G. W. Harper, R.N.; Bramblewood, Bushby Avenue, Rustington, Sussex.

Laphygma exigua and Nycterosea obstipata.—One *L. exigua* was taken in my light trap at Bryanston School, Blandford, Dorset, on July 25, and a second at my other light trap on August 14 at the address below, where also single specimens of *N. obstipata* were taken on April 25, and August 12 and 17, 1947.—John Howell; Lychwood, Worplesdon Hill, Woking, Surrey.

RECENT LITERATURE.

The London Naturalist for 1946.

This annual volume of the London Natural History Society, published in December, 1947, contains a supplement of unusual entomological interest, namely Part I of an account of the Thysanoptera of the London area, by Guy D. Morrison. This first instalment does not go further than keying the Thrips to families; but it includes a useful compact résumé of the anatomy, physiology and bionomics of the Order; and it extends far beyond the radius of 25 miles from St. Paul's Cathedral. N. D. R.

German-English Science Dictionary. By L. de Vries. New York and London, 1946. 558 pp.

This second edition has been revised with special reference to chemistry, though much else new has also been added. It is still possible, however, for the entomologist to think up terms from the remote fastnesses of his science which are not included, but all the everyday words are there, and indeed the cover is on the whole surprisingly complete. N. D. R.

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MIGRATION RECORDS, 1947.

BY CAPT. T. DANNREUTHER, R.N.

INSECT immigration in the British Isles was as remarkable as that recorded in 1945, but in cases where the figures show unprecedented abundance the species were different and the cause of the change cannot be interpreted until analysis of these records has been completed and compared with Continental experiences. It was hinted in the 1945 summary that a major cause was probably connected with the great drought which extended from North Africa through Spain and France, and was reported the worst for 150 years in the Basses Pyrénées (*Times*, April 3, 1946). In 1947 the drought experienced on the Continent and in Germany in particular was the worst since 1808 (*Times*, February 11, 1948). When the area of origin of our immigrant swarms has been ascertained, a correlation between such areas of extreme drought may be found to define the species affected. 1945 was the "Bath White Year" as well as the "Long-tailed Blue," and many rare vagrants were prominent. 1947 was the "Clouded Yellow Year" as well as for the "Vestal" and the "Gem," but those species in 1945 were only normal or scarcer. Other of the regular seasonal immigrants were in great abundance in both years, but the emphasis changed in the species as the figures indicate.

The figures themselves are largely guess-work as so many casual records of the commoner species were merely expressed in "hundreds" or vague terms to which a conservative figure had to be assigned, but the "approximate numbers recorded" probably represent the relative abundances as between species in the season, though not from year to year because of the steady increase in observation. In 1945 the number of schedules of daily observations kept increased from 25 in 1944 to 50; and in 1947 to 90, from 60 in 1946, yet we still lack schedules from many large areas in Scotland and Ireland to balance the south. In 1948 it is hoped to enlist the services of school Natural History societies and field clubs to keep schedules, in addition to those of lepidopterists interested, which should help to show the spread of migrants on arrival and how they bred. For this purpose, Dr. C. B. Williams has written the text of a *Daily Mail* school-aid illustrated booklet on *Butterfly. Migration*, now published in the "Young Britain" series (price 1*s*., 1*s*. 3*d*. with tax).

I. *General Summary of Insect Records*, 1947.

The long fine summer of 1947 not only allowed immigrants to breed several generations in the British Isles, but for the first time a large scale emigration of *Colias croceus* was witnessed in October with a small proportion of other species.

The tables which follow contain figures which, for reasons already given, are not comparable with previous years though given in the same form. Crude totals shown on representative schedules have been replaced by the highest daily counts as it is thought that the latter present a better picture of the relative abundances found at their maxima in each species in widely separated districts with an example, near Hastings, of how these are affected where immigrant swarms are actually seen on arrival. The number of dates when immigrant insects were recorded, may vary with temporary absence of the observer, but those for the Scottish schedules represent real absence of insects on other days.

RECORDED ABUNDANCE AND RANGE OF REGULAR IMMIGRANT INSECTS IN 1947.

Species.	Approximate numbers recorded.	First seen.	Northern range.	Last seen.
V. cardui	*c.* 12,000	April 9 Sherborne, Dorset.	June 7 Unst, Shetland.	November 30 Woolacombe, Devon.
V. atalanta	*c.* 13,000	March 20 London, N.W. 7.	May 15 Whalsay, Shetland.	December 29 Paignton, Devon.
C. croceus	*c.* 36,000	April 16 Brighton, Sussex.	August 31 Keiss, Caithness.	December 7 Bridgwater, Somerset.
C. hyale	870	May 10 Sandwich, Kent.	June 30 I. of Coll, Argyll.	November 29 Plymouth, Devon.
A. atropos	28 larvae 40	May 12 Christchurch, Hants.	September 16 Trondra Isl. Shetland.	October 16 Hastings, Sussex.
H. convolvuli	276	July 22 Sway, Hants.	August 16 Unst, Shetland.	October 17 Swanage, Dorest.
M. stellatarum	*c.* 4200	April 16 St. Ives, Cornwall.	June 9 Scalloway, Shetland.	December 24 Tysoe, Warwickshire.
P. gamma	*c.* 90,000	May 3 Nunthorpe, Yorkshire.	June 7 Unst, Shetland.	November 28 Peel, Isle of Man.
N. noctuella	*c.* 4000	May 4 Timoleague, Co. Cork.	August 23 Grimisay, Outer Hebrides.	November 21 Bradwell, Essex.

HIGHEST DAY COUNTS OF IMMIGRANT INSECTS RECORDED ON REPRESENTATIVE SCHEDULES IN 1947.

Locality.	Species.						Observer.
	V. cardui	*V. atalanta.*	*C. croceus.*	*M. stellatarum.*	*P. gamma.*	*N. noctuella.*	
Scalloway, Shetland . .	2	6	..	1	1	..	W. J. Williamson (22 dates).
Keiss, Caithness .	23	47	20	4	13	..	S. Swanson (56 dates).
Timoleague, Co. Cork . .	250	191	49	13	350	18	Mrs. G. E. Lucas (127 dates).
Skokholm, Pembrokeshire .	59	157	42	2	20	..	Bird Observatory (97 dates).
Bickenhall, Som.	28	74	101	31	83	5	A. H. Turner. (159 dates).
St. Mawes, Corn.	200	200	200	200	400	..	V. Heath (85 dates).
Plymouth, Devon	200	150	307	47	88	17	F. W. Jeffery (118 dates).
Hawley, Hants .	12	47	32	1	9	8	A. W. Richards (98 dates).
Eastbourne, Sussex	40	50	221	20	30	..	C. H. Hutchinson (99 dates).
Pett, Sussex .	3000	5000	1048	50	710	2000	A. Denby Wilkinson . (133 dates)
Sheerness, Kent .	5	7	33	14	8	..	A. B. Grant (119 dates)
Chislehurst, Kent	65	39	80	15	400	17	D. F. Owen (99 dates).
Bradwell, Essex .	16	17	41	9	16	14	A. J. Dewick (142 dates)
Barrowden, Rutland . .	5	15	80	4	20	..	J. K. Bates (63 dates)

(Number of dates shown are those when immigrant species were recorded by observer; but the figures of highest day counts are in no way comparable with the crude totals given in previous annual summaries. The present table exhibits the maximum relative abundance in the season according to locality. The high figures at Pett were directly due to observed waves of immigration detailed below.)

II. *Records of Insect Movements*, 1947.

Vanessa cardui.—On June 1 and subsequent days a few dozens were first seen coming in from sea flying north-eastwards at Bradwell-on-Sea (Essex), Pett Level (E. Sussex), Studland Bay (Hants), and Bull Point (N. Devon), and at Newlyn (S. Cornwall), about 700 accumulated on the cliffs courting (D. E. Bowden). From

July 2 to 11 at Swanage "very many" in poor condition were moving N.W. On August 21 at Skokholm Island (Pembs) a dozen flew east; but at Lundy Island, South Lighthouse, from August 17 to 23 each evening some took off flying south to sea (L. H. Hart), and there on September 17 about 500 in excellent condition flew S.E. at about 200 per hour from noon in a light S.W. wind. Yet at Pett Level (Sussex) from noon to 3 p.m. G.M.T. on September 11 it was estimated that at a density of 50 per hour on a 50 yard front they came in flying N.N.W. with several other species in company estimated to total 3000 (R. Cooke).

Vanessa atalanta.—At Southwick (Sussex) at noon on April 24 in a strong S.W. wind, 11 came in flying N.E. (B. Stonell). No immigrant swarms were seen until August 11, when from 2.30 to 6 p.m. B.S.T. about 500 per hour of each species, *V. atalanta* and *P. brassicae*, came in at Gara Point in the Yealm Estuary (S. Devon) on each 100 yards of coast in a light E.S.E. wind (O. D. Hunt). On Lundy Island numbers increased to 100 on August 17, when until 23rd they were seen taking off in a southerly direction daily (L. H. Hart); but at Skokholm Island (Pembs) on August 21 157 at 26 per hour nearly all flew in an easterly direction (P. J. Conder). On August 24 in late afternoon hundreds flew from the Mull of Galloway and landed at Rue Point on N.W. coast of Isle of Man and dispersed to flowers (I. P. Watson). On September 11 from 9 a.m. to 3 p.m. G.M.T. at Pett Level (Sussex) a mixed flock mostly of *V. atalanta* came in from sea at a density of 50 or 60 per hour on a 50 yard front extending over a mile of coast, estimated to total about 5000. Flight was to N.N.W. coming in and then more westerly (A. Denby Wilkinson). On September 17 at Lundy Island from noon to 6 p.m., there was a S.E. flight at 200 per hour of fresh specimens, some dallying on shore (L. Hart). On September 24 at Seven Sisters, Eastbourne, 50 came in flying north in one hour over the cliffs (C. H. Hutchinson). On October 6 and 8 about 50 passed flying S.S.W. in half an hour from Hamel Down above Widecombe, with a stream of *C. croceus* and *A. urticae*. On October 14 at the Owers Light Vessel, 7 miles south of Selsey Bill, a mixed flock of 50 tired insects drifting south passed from 7 to 8.30 a.m. G.M.T. in warm misty weather (S. G. Sharman), mostly *V. atalanta* but also *C. croceus*, *M. stellatarum* and diptera. From August 2 to November 23 single specimens elsewhere were also recorded flying south.

Colias croceus.—From May 29 when the main immigrations began there were three of special significance. On August 11 from 2.30 to 6 p.m. with a light E.S.E. wind at Garra Point, Yealm Estuary, near Plymouth, they came flying in from sea to the north estimated at the rate of 3000 per hour for each 100 yards of coast with some *V. atalanta* and *P. brassicae* in association (O. D. Hunt). On August 16 at Pett Level, east of Hastings, in one minute at 2.30 p.m. G.M.T. a "Yellow Cloud" with a front of 100 yards. depth of 150 yards and height up to 75 ft. above the water, came in from sea flying fast to N.N.W., estimated at more than a thousand. Wind East 3 (R. Cooke). On September 8 at St. Lawrence, south Isle of Wight, at 4 p.m. with a light S.E. breeze, a similar "Yellow Cloud" came in flying N.W. on a front of 50–100 yards (Dr. L. B. Langmead). (F. W. Frohawk in his *Complete Book of British Butterflies* (Ward Lock, 1934, p. 330) quotes a similar "yellow patch out at sea" coming in to Marazion in 1868. At Beachy Head about 1918 also a "yellow ball" of *C. croceus* came in (Mrs. W. Boyd-Watt). It is apparently a rare event occurring in anticyclonic weather.)

The 1947 records of *C. croceus* migrating "in hundreds" are notable for diversity of the flight directions recorded as follows :—To north or N.W. : August 3, Studland (Dorset) ; August 3, Sandwich Bay (Kent) ; August 8, Owers Light Vessel, off Selsey Bill ; August 10, Rame Head (Plymouth) ; August 23, Bantham (S. Devon) ; August 26, Ludlow (Shropshire) ; September 11, Fairlight (Hastings) and September 15, Pett Level (E. Sussex).

To north-east : August 13 to 23 daily at St. Mawes (Cornwall) 200 per hour at maximum (V. Heath) ; August 24 to September 18, also at St. Mawes, coming in with Whites occasionally.

To east or S.E. : August 8 to 10 to Chesil Beach (Dorset) ; August 21 and 22, near Newton Abbot in *P. brassicae* swarms of thousands.

To west or W.S.W. : August 8 at Charmouth (Dorset) ; August 21 at Bude (N. Cornwall) in steady stream for 3 hours (J. L. Palmer).

The first flight to S.E. was on June 2 at Bull Point Lighthouse, near Ilfracombe, of 20 coming in from sea in pairs (A. W. Godfrey).

To south or S.S.W., i.e. emigrating : September 12 at Lymington, first noticed a "number flying low straight out to sea in face of wind south 3" with some Whites (Q. Bone). September 26 on Portland Bill in an easterly gale, 100 sheltered in rocks, some going out to sea (L. C. Powys) ; October 6 to 8 several observers reported a constant stream of *C. croceus* with some *V. cardui*, *V. atalanta*, *A. urticae*, *P. brassicae* and *P. napi*, flying south or S.S.W. to Ashburton and beyond (Eng.-Capt. Stidston and P. W. E. Currie) several hundreds. October 12 at East Chaldon (Dorchester) "many making for south" (Miss G. M. Powys). October 12, Pett Level (E. Sussex), 68 flying S.S.W. (A. Denby Wilkinson). October 12 and 14 at Owers Light Vessel, off Selsey Bill, "definitely flying south, 6 at a time in mornings, males on 12th and females on 14th with other species" (S. G. Sharman).

Finally, on October 14, a unique observation of some thousands all flying S.S.W. with a light N.N.E. wind as seen from H.M.S. Belfast returning home at 15 knots from off Ushant at 10.30 a.m. B.S.T., sighting the Lizard and thence to the Start at 5 p.m., all the time observing single specimens averaging 30 feet apart with several in sight either side of cruiser (one captured was a male), 20 to 50 feet above the sea (Lt.-Comdr. J. Blake, *Entom.*, **81** : 42). As course was altered from the Lizard up Channel, the butterflies were crossing thus giving the width of the stream which must have amounted to many thousands as at least 2000 were passed in sight.

In addition to the above between May 14 and November 26 the record cards from many observers in southern counties show smaller numbers giving the flight direction as follows: to northwards 254; to eastwards 119; to westwards 230, and to southwards 168, showing a slight preponderance to north and west, including a few in Ireland and up to Durham singly.

The great emigration of October 14 did not clear the country of the species. It was last seen in Argyllshire on October 25, and in the south of England as late as December 7 (Devon and Somerset).

Colias hyale.—On August 12 and 13 at Sandwich (E. Kent) three dozen came in from sea, mostly females with 50 *C. croceus* (*Entom.*, **80** : 242). All flew straight inland, i.e. to Westward. On September 11 at Wrabness, near Harwich, up to 20 females were flying west up the Stour Estuary, with some *V. cardui*, *C. croceus* and a *N. antiopa* (Miss M. D. Goodall). In August single specimens were recorded: 4 flying north in Devon and Sussex; 2 to west in Sussex and Kent; on October 4 one to east at Patcham, and to north at Brighton. On October 26 at Eynsford (Kent) 3 flew south (D. F. Owen).

Macroglossum stellatarum.—At Cliff End, 4 miles east of Hastings, throughout June there was found a constant trickle of single specimens coming in direct to cliff face 100 feet above the sea. The timed rate was a maximum of 25 per hour from dawn to 6 p.m. as observed on June 1, 3, 11, 17, 18, 24, 29 and a few on July 14. Altogether the site of arrival was visited 80 times, on 30 of which a total of 201 moths were counted coming in from the S.S.E. and splitting east or west with very few mounting over the cliff top or resting. The dates quoted are the only ones during which immigration was witnessed and 100 of these were between June 1 and 4 (A. Denby Wilkinson, details in *Hastings and E. Sussex Nat.*). At Bull Point Lighthouse, N. Devon, on September 19 more than a dozen were flying north in company with hundreds of *P. gamma* and *P. meticulosa* at 10 p.m. B.S.T. (A. W. Godfrey). On October

12, 7 to 8 a.m., a dozen arrived at the Owers Light Vessel, off Selsey, drifting south with other species—4 captured settled on the lantern (S. G. Sharman).

Plusia gamma.—On July 28 in half-hour from 1 a.m. at the Bull Rock Lighthouse (Co. Cork), about 200 passed flying north or N.E. at the lantern height of 270 feet above the sea ; six captured were in fresh condition (J. O'Brien). Three swarms were recorded passing the Bull Point Lighthouse (N. Devon) : on August 9/10 (23.20–02.10 D.S.T.) an uncountable swarm estimated at 8000/10,000 flying N.N.E. in calm at 160 feet above sea : on August 18/19 (23.20–04.30 D.S.T.) ditto estimated at 20,000/30,000 flying west towards Lundy Island with perhaps 5000 *C. graminis* in company. Density varied from 40 to 200 per minute in calm , on September 19 from 20.45 to 22.00 B.S.T. in a drizzle an estimate of 8000 passed flying north—50 specimens sent in mainly fresh with *M. stellatarum* and *P. meticulosa* amongst them (A. W. Godfrey). Lundy Island South Lighthouse is 18 miles due west of Bull Point and the following records may be part of the same swarms when dates correspond. At Lundy on night of August 13 about 70 passed to north ; on August 19 from 02.30 to 05.00 about 25,000 passed flying south with some *C. graminis* ; on night of August 23 about 40 passed south and on October 6/7 from 23.30 to 02.15 100 passed to north with 40 alighting on the lantern (L. H. Hart). On September 3 at the Start Lighthouse (Devon) about 2 dozen flying north were seen coming in from sea (G. W. Phillips).

Nomophila noctuella.—In a field at Cliff End, near Hastings, the schedule keeper recorded 12 on September 5 and a thousand on 6th, which had all disappeared next day. Again on September 17 another wave estimated at 2000 turned up which reduced to 250 by September 22 (A. Denby Wilkinson). On September 17 at Folkestone 168 were counted in the Warren (A. M. Morley). On September 18 at Seaford hundreds suddenly appeared, reduced to dozens next day (A. R. Kidner).

Aglais urticae.—On September 11 at 2 p.m. butterflies were coming in from sea flying N.W. into Pett Level (E. Sussex) in a light S.S.W. wind. On a 50 yard coast line it was estimated that there were 50 *A. urticae* to 60 *V. atalanta* arriving per hour (R. Cooke).

Pieris brassicae.—At Fareham, Hants, on June 24 thousands were flying eastwards the whole forenoon against the breeze (Dr. C. Suffern). At this period there was a large movement over Central Dartmoor to the N.E. (H. M. Edelsten). On July 14 at Coaley (Glos) there was a snowstorm of Whites estimated at 10 per sq. ft. in places flying N.W. over the Scarp at Hetty Peglers Tump across the Leigh (A. D. Norton). July 14 to 20 at Brighton all day from 5 to 8 per minute came in flying N.W. On July 23 and 24 thousands came in at Fairlight (Hastings), Newhaven, Eastbourne, flying N.W. or W. and up to July 29, also at Rye, Alfriston, Swanage and inland at Shaftesbury and Birmingham, moving in steady streams of hundreds or thousands. On the East Coast form July 23 to 30 " hundreds per hour " came in flying west or S.W. at Leiston, Weybourne and Sheringham (Norfolk). On August 3 there was extensive immigration near Skegness, and on August 12 high water line between Mablethorpe and Theddlethorpe (Lincs) was strewn with casualties about one to the yard. On August 11 further west a maximum immigration of 6000 per hour flying north in the afternoon came in at Gara Point, Yealm Estuary and at St. Mawes (Cornwall) at 1000 per hour, with hundreds up the River Axe (Dorset) and into Lyme Regis. In other places the immigration continued but *P. brassicae* was gradually replaced by *P. rapae.*

Pieris rapae.—On July 9 at the Isle of Grain (Essex) large numbers came in up the Thames Estuary to the Medway (H. M. Edelsten) and were noticed flying north in thousands in Berkshire and London. By July 12 in a calm about 7000 passed through Wood Walton (Hunts); on July 19 it was flying north through Oxfordshire at 60 per minute. From July 21 to 28 there was fresh invasion at Eastbourne and with a " cloud of *C. croceus* " at St. Lawrence, Isle of Wight, in groups of a 100 to N.E. over the cliffs to 9 p.m. B.S.T. (Dr. T. T. Laidlaw). In early August " clouds " came into Sandwich flying W.N.W. and on 23rd were drifting in at 12 to the minute at Pett, W. Wittering, Selsey Bill, with myriads around the Owers Light Vessel. Again from September 3 to 9 thousands came in or passed parallel to west along the coast observed at Pett Level, Swanage, Exmouth, Start Point. At Pett the immigration continued up to September 15 at 100 per hour on a 50 yard front.

LIGHT VESSELS RECORDS.—Between July 18 and August 13 the following insects were captured and identified at the Castle Museum, Norwich: *Libellula quadrimaculata* at the Smiths Knoll, situated 21 miles east of Great Yarmouth (J. W. Reeve, Master). Species from here recognized as migrants were *Pieris rapae, Euproctis chrysorrhoea, Apamea monoglypha, Amathes c-nigrum, Agrotis ipsilon* and not so recognized *Aphomia sociella, Hadena suasa, Calothysanis amata, Deuteronomus erosaria, Diarsia rubi, Hadena trifolii, Cosmia trapezina, Gastropacha quercifolii, Cossus cossus* and the Lacewing *Chrysopa carnea.* At the Haisbro' Light Vessel, situated 8 miles N.E. of Mundlesey (W. M. Ling, Master), between August 20 and 27 flying east were two *P. gamma* and with them were also *E. chrysorrhoea, Triphaena pronuba, D. rubi, C. amata,* *Comacla senex, Nymphula stratiotata.* (For Owers Light Vessel see above.)

III. *Notes on Distribution of Regular Immigrant Insects,* 1947.

Vanessa cardui.—Figures on schedules show that in spring the species was scarce to common except where immigration was recorded. From August 21 to 25 " they were literally in thousands two miles from Chicken Rock Lighthouse, Calf of Man." Between August 7 and September 17 the summer brood was in " hundreds " at Plymouth, Axmouth, Brighton, Skokholm Is., St. Mawes, Barry. Lundy Is., Timoleague, Wexford, Galway, Courtmacsherry (Kinsale), Gorran Haven (Cornwall), Weston-super-Mare. Elsewhere a dozen or two was the maximum.

Vanessa atalanta.—Only two winter records reported : January 1 in an Eastbourne garden and March 20 settled on a letter-box in London, N.W. 7, in the sun. One seen at Hastings, March 28. Next at Dungeness April 9, then singly in many places to the end of May. On June 4 about 60 were seen at Newlyn, Penzance, and in August–September summer broods produced " hundreds " at Brighton, Axmouth, Plymouth, St. Mawes, Weston-super-Mare, Lundy Is., Bickenhall, and Timoleague (Co. Cork), with the result that total abundance equalled that of *V. cardui* in the fine weather autumn.

Colias croceus.—It is impracticable to estimate the density of this species in the " greatest Clouded Yellow Year " on record. An estimate is that, compared with *V. cardui* or *V. atalanta,* the abundance was about three times as great as either of the latter. In mid-August " thousands " were recorded at Plymouth, Mount's Bay and Polperro, and up to November it was in " hundreds " at no less than 60 places in the southern counties with maxima in the north of 150 at Redcar and in the west at 191 at Timoleague. Though mostly singly, 261 were recorded in 18 Scottish counties. It was not common anywhere before May 31 and then mostly males, but when females began to predominate many observers recorded an unusually high proportion of var. *helice* or ab. *pallida* present, of which long series were captured. The long anti-cyclones in summer allowed of successive broods at short intervals and broods overlapping. An example from Wells gives emergences on June 14, August 10, September 30 and November 13 (A. Valentine). Others recorded intermediate dates probably due to variations in local temperatures. Wing expanse of 60 mm. (considered normal by Frohawk) was unusual and some dwarfs were reported down to 32 mm. in typical females. In the far north, at Wick, no var. *helice* were recorded in the 40 seen August 31 to September 13

(S. Swanson). At Letchworth an emergence in October survived 70 days to December 21 and a female deposited as late as November 3 (S. R. Bowden). It was last seen December 4 to 7 at Paignton, Sidmouth and Bridgwater (previous December records in 1825–1939 period, only twice).

Colias hyale.—Though a total of 870 recorded in 1947 is nothing like the 2203 recorded by fewer observers in 1900, in no other year since 1825 has it been so abundant. The corrected figure of 318 for 1945 and 31 in 1946 shows it in better perspective and for the second time only has it been seen in Scotland: near Loch Cliad in the Isle of Coll on June 30 (Prof. J. W. Heslop Harrison, *Entom.*, **81** : 1). The first was one seen at Powfoot, Dumfries, on August 14, 1933 (H. C. S. Halton). It was not common anywhere until August 3 in Kent, where a fresh brood emerged and others were coming in from sea to Sandwich. In August 71 were recorded—4 males to 3 females—in Isle of Thanet (G. E. L. Manley); 40 at Deal (E. G. Neal); 36 females at Sandwich (D. M. Batcheley). At the Start up to 2 dozen came in and settled on Fleabane flowers August 16/18 (Miss Edwards). In September a maximum of 50 was recorded at Folkestone (A. M. Morley), and 35 were taken in the autumn in Lucerne fields at Westerham (J. R. Brunsdon). On September 14 several were identified near Barrow-in-Furness where it is very rare (J. L. Kershaw). At Battlesbridge in Essex on October 12 emergence and oviposition in Lucerne was seen with 2 dozen present (W. P. Seabrook). Even in Kent one observer remarked that there were "ten times as many *C. croceus* as *C. hyale*" and schedule figures indicate even greater disparity or absence in many localities as usual.

Acherontia atropos.—Nearly all the 28 moths and 40 larvae were recorded in the south, the exceptions being single specimens at Oxford, Diss (Norfolk) and Shetland. A few were bred successfully.

Herse convolvuli.—This is usually the last of the regular immigrant species to appear. In 1947 the first were near Lymington on July 22 and August 1, but full-grown larvae were found in Merionethshire by September 12 (P. J. Gent). On September 18 the largest accumulation of about 4 dozen were found at Red Nicotiana at dusk at Chelmsford, and 57 were counted at Swanage up to October 17 (L. Tatchell). Only three had been seen in the south before one appeared in Unst, Sheltand Is., on August 16 (Mrs. M. C. Sutherland).

Macroglossum stellatarum.—Like other immigrants it only appeared singly to June 1, when immigration was observed near Hastings. Thereafter it became commoner than usual everywhere. On June 12 at Weston-super-Mare 80 were recorded on Valerian

(C. S. H. Blathwayt). On August 20 there were about 200 at St. Mawes, Cornwall (V. Heath). It was reported in " dozens " at Plymouth, Totnes, Bickenhall, Hastings, Folkestone, Westwell (Oxon), Llandudno, Ilfracombe, Littlehampton, Swanage, Lundy Is. and Hunstanton. In October " hundreds " at Barton (Hants) and at Ilfracombe, " score at a time, thousand in the aggregate " (M. V. Palmer). An unprecedented abundance of over 4000 and certainly double the 1945 figures.

Plusia gamma.—It is still a mystery where the myriads seen migrating from lighthouses (recorded above) bred: no damage to crops suggested such large abundances and many observers reported numbers below normal years. Places where it was " very abundant " were Nunthorpe (Yorks) in June, Pett and Fairlight (Hastings) and Sandwich early August, Kingswear August 9, Barry (Bristol Channel) September 15, Blackheath September 19 and Timoleague (Co. Cork) October 15 and 25. Schedule counts run to " hundreds " as a maximum also at St. Mawes, Totnes, Bideford, Gobowen (Salop), Chislehurst, but others showed hardly any in the season as exhibited in the table for Sheerness and Hawley (Hants). A larva found on Snapdragon on January 1 at Casteltown, Isle of Man with one found on December 14, 1946, were bred indoors, one emerging January 21 (C. I. Paton): this is the only record prior to May 3 at Nunthorpe (J. F. Raw).

Nomophila noctuella.—At St. Leonards-on-Sea 50 to 100 from August 17 was followed by a thousand at Cliff End, six miles east, on September 6 and 2000 September 17. It was also in " hundreds " in mid-September at Folksetone, Dungeness and Seaford. Though not generally reported, it was recorded on 17 schedules in 1947.

Pieris brassicae.—Advisory Entomologists of N.A.A.S. report damage to crops by larvae severe to the end of August in south-eastern counties but only locally severe in the north in the Shetlands where *Apanteles glomeratus* later kept down the larvae. In the Penzance district myriads destroyed 10,000 acres of brocolli (*Daily Herald*) in September. In July myriads at Stroud (Glos) resulted in all crucifers being badly attacked. In August butterflies were " estimated at a myriad " near Bognor Regis and larvae swarmed in the Outer Hebrides. Thousands were reported at Pembroke, Tavistock and Durham with consequent damage to crops.

(To be continued.)

EILEMA DEPLANA IN THE ISLE OF WIGHT.—On July 15, 1947, I took at Totland Bay, Isle of Wight, an *Eilema deplana.* Dr. K. G. Blair, of Freshwater, I.O.W., tells me that this species is new to the Isle of Wight records.—GEORGE C. HOLROYD; 8, Elmside, Guildford.

BIRD FLEAS COLLECTED BY MISS THERESA CLAY, COLONEL RICHARD MEINERTZHAGEN AND CAPT. W. H. POLLEN IN THE ISLAND OF USHANT, BRITTANY, FRANCE, WITH A NOTE ON THE DISTRIBUTION OF *CERATOPHYLLUS BOREALIS* ROTHSCHILD (1907).

By Miriam Rothschild.

With 3 text-figures.

The fleas collected on the Island of Ushant which are listed in Table I were all obtained off the bodies of birds during the main influx of migrants moving northwards on their spring passage. The high proportion of *Ceratophyllus borealis* Roths. (1907), a flea very closely related to *Ceratophyllus garei* Roths. (1902), is a remarkable feature of the collection.

C. garei (which it is convenient to consider first) is a circumpolar species extending southwards to central Europe, and through Alaska and Canada to the western United States, parasitizing a wide range of bird hosts, chiefly those which nest on the ground or in damp situations. It is common on the mainland of Great Britain (see Fig. 1), and is also recorded from the Orkney and Shetland Isles and the Inner Hebrides. Specimens from these localities are in the British Museum collections.

C. borealis is a species with, apparently, a more restricted habitat, and its known distribution presents some interesting features. Specimens conforming with the types in the British Museum (C. Rothschild Collection) have been recorded from the following localities (see Table II): Isle of St. Kilda, Scotland (1); Isles of Shetland, Scotland (5); Inishtrahull Isle, Ireland (2); Isles of Scilly, England (3); Island of Ushant, France (8); Iceland (1)*; and various localities in the Alps (5). *C. garei* has not been recorded from any of these areas with the exception of the Shetland Isles and Iceland.

Typical *C. borealis* is, apparently, absent from the mainland† of Britain. There are three mounted female specimens in the British Museum (Waterston Collection), one taken from the nest of the Herring Gull (*Larus argentatus* Pont.), and two from that of the Dipper (*Cinclus cinclus* [L.]) from the east coast of Scotland

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* There are four records from Iceland of which there are no specimens in the British Museum Collections (see Table II).

† G. B. Thompson (1937) recorded *C. borealis* from the Wheatear (*Oenanthe oenanthe* [L.]) from Derbyshire. He also recorded *C. garei* from the same locality and host. These identifications require corroboration.

(Waterston, 1914), but these are not typical, and the distinctive specific characters such as the receptaculum seminis, and particularly the 7th sternite, vary in the direction of *C. garei* (see Figs. 2 and 3).

A single male of *C. garei* (British Museum, Waterston Collection) was taken with the female from the nest of the Herring Gull. The exact status of all these three female specimens is doubtful, and one can but regret that no other males were taken. They may represent an intermediate form between the two species which is peculiar to the mainland, or alternatively they may be true *C. borealis* or *garei* which show variations inclining towards the closely allied species. Dr. Jordan has pointed out to me that in various species of fleas

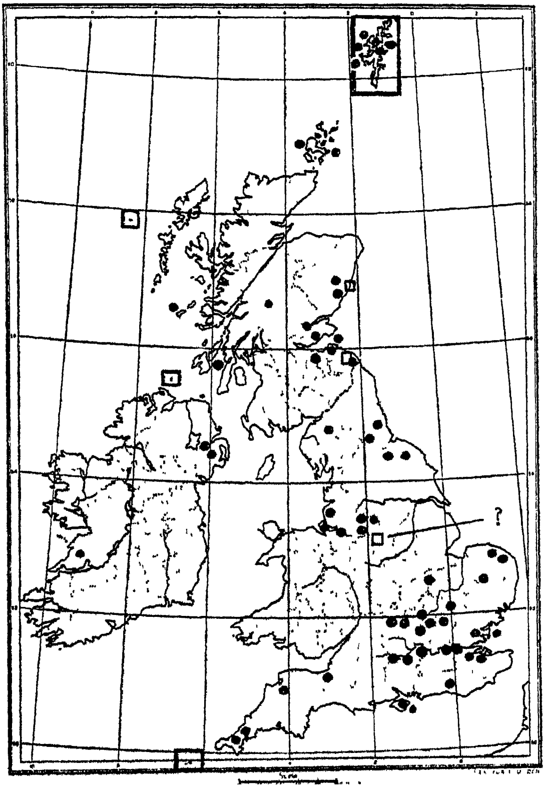

FIG. 1.—Distribution of *Ceratophyllus garei* (based on 61 records), and *C. borealis* (based on 13 records) in Britain. ● ● ● *C. garei.* ☐ *C. borealis.*

one may find small local populations in which some ancestral character has reappeared. For example, the small marginal projection of the 7th sternite may be absent in the majority of female specimens of *Ctenopthalmus agyrtes* Heller (1896) from certain localities. He considers this the most likely explanation of the three atypical female specimens referred to above.

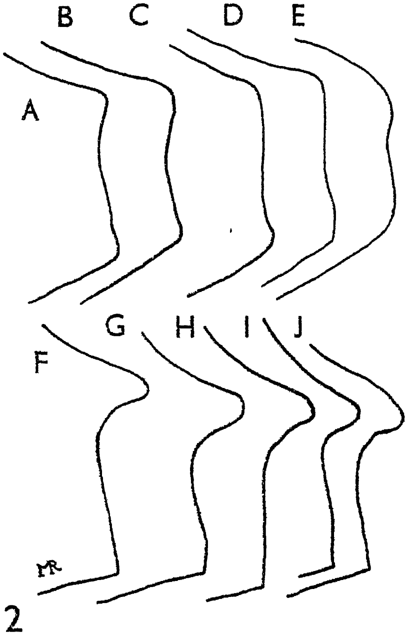

FIG. 2.—Seventh sternite of females of *C. garei* and *C. borealis*.
A. *C. borealis* (?), atypical specimen from Berwick, Mainland of Scotland. Host: *Cinclus aquaticus*.
B. *C. borealis* (?), atypical specimen from Kinneff, Mainland of Scotland. Host: *Larus argentatus*.
C. *C. garei* from Iceland. Host: *Dafila acuta*.
D. *C. garei* from Iceland. Host: *Anas strepera*.
E. *C. garei* from Lamba Isle, Scotland. Host: Shag.
F–H. *C. borealis* from Haylor, Shetland. Host: *Anthus obscurus*.
I. *C. borealis* from Ushant, Brittany. Host: *Cuculus canorus*.
J. *C. borealis* from Inishtrahull. Host: *Oenanthe oenanthe*.

Nordberg (1934 and 1936) lists fifteen bird hosts for *C. borealis* in Finland, of which ten are new. For the sake of completeness these records are included in a separate table (Table III), but all require corroboration before they can be accepted. Unfortunately, the specimens concerned are not available for comparison.

In 1937 Wagner described a new subspecies of *C. garei* collected in north-west Iceland which he named *C. garei islandicus.* Dr. Jordan considers this identical with *C. garei,* a species which varies within wider limits than those described by Wagner. In the British Museum (C. Rothschild Collection) there is a series of some fifty specimens of both sexes of typical *C. garei* from Iceland, and in addition there is one female specimen of *C. borealis,* the host of which is unknown.

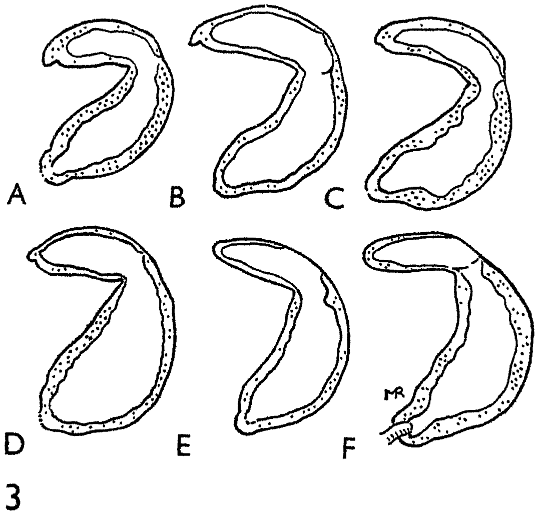

FIG. 3.—Receptaculum seminis of *C. garei* and *C. borealis.*
A. *C. borealis* from Iceland. Host unknown.
B. *C. borealis* from Haylor, Shetland. Host : *Anthus obscurus.*
C. *C. borealis* (?), atypical, from Berwick, Mainland of Scotland. Host : *Cinclus acquaticus.*
D. *C. borealis* (?), atypical, from Kinneff, Mainland of Scotland. Host : *Larus agentatus.*
E. *C. garei* from Iceland. Host : *Anas strepera.*
F. *C. garei* from Shetland. Host : *Larus fuscus.*

Ewing and Fox (1943) record *C. borealis* from West Greenland, but they give neither the present location of the specimens, nor the host or collector. In the British Museum Collection there are two males and two females of *C. garei* from West Greenland, off the Arctic Ptarmigan (*Lagopus rupestris* Gm.), but no examples of *C. borealis.*

The whole problem is somewhat complicated by the fact that in Western Europe *C. borealis* appears to have a distinct host preference for the Wheatear (*Oenanthe oenanthe* ([L.]). Whereas there are single records of typical *C. borealis* from fourteen species of birds and two from the White Wagtail (see Table II), there are no less than eight (possibly nine) from the Wheatear. This bird is fairly conspicuous and its nest relatively easy to find. One would therefore expect a large number of flea records from it, but the contrary is the case. We have one doubtful record of *C. garei* and only four of *Dasypsyllus gallinulae.* This latter species was taken twice from a Wheatear's nest in the Shetland Isles (the specimens are in the British Museum, Waterston Collection) and once by E. O'Mahony (written communication), with a series of nearly 200 *C. borealis* bred from one nest on Inishtrahull. Another was collected by Miss T. Clay in the Orkney Islands (Meinertzhagen Collection). From another host of *C. borealis,* for example the Skylark (*Alauda arvensis* L.), there are three records of *C. garei,* six records of *D. gallinulae,* and two records of *C. gallinae* Shrank (1803) (specimens in the British Museum, Waterston and Rothschild Collections, and Meinertzhagen Collection), besides several published records which require corroboration.

On the Island of Ushant during the spring migration the Wheatear is present in very large numbers. It should be noted that here *C. borealis* was also taken from the House Sparrow (four specimens off one bird) and the Cuckoo, from which species no flea has ever previously been recorded. It cannot altogether be ruled out that the species may have been brought to the island by the migrating Wheatears, or at any rate is numerically reinforced by specimens straggling from them, and has thus become generally established on the resident birds.

If Nordberg's identifications are confirmed the White Wagtail (*Motacilla alba* L.) is apparently preferred in Finland. He examined nine nests of this species and four nests of the Wheatear from the Helsingfors district. *C. borealis* is said to have been present in all nine of the former, but absent from the nests of the latter bird.

It is very interesting that the distribution of these closely allied species of fleas bears a strong resemblance to that described by Richards (1935) for the equally closely allied bumble bees *Bombus muscorum* (Linnaeus) and *B. smithianus* White. The latter has a north-western distribution which "fringes the coast of the British Isles, Norway and Finland and only penetrates far inland in Russia." The distribution of *C. borealis* is more markedly north-western, fringing the coast of Iceland, the British Isles and Northern France and has been only found inland in the Alps. As already stated, the Finnish records require corroboration. *Bombus muscorum,* like *C. garei,* occupies a much wider area, and is recorded on the mainland of Britain and also from large portions of the continent of Europe. In Britain and Northern France *B. smithianus* is recorded from Shetland (not Orkney Isles), Outer Hebrides, Tiree

TABLE I.—*Bird Fleas collected in Ushant, Brittany.*

Species of flea.	Number and sex.	Host named by collector.	Date.	Collector.	Location of specimen.	By whom flea identified
Ceratophyllus borealis Roths. (1907)	1♂	*Anthus pratensis* (L.). Meadow Pipit	April, 1947	T. Clay and R. Meinertzhagen	R. Meinertzhagen Collection	M. Rothschild.
,,	1♀	*Cuculus canorus canorus* L. Cuckoo (♂)	April, 1947	T. Clay and R. Meinertzhagen	M. Rothschild Collection	M. Rothschild.
,,	1♂, 1♀	*Motacilla flava rayi* (Bp.). Yellow Wagtail	April 21, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
,,	4♂, 2♀	*Oenanthe oenanthe oenanthe* (L.). Wheatear	April 24, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
,,	1♂	*Oenanthe oenanthe oenanthe* (L.). Wheatear (♂)	April, 1947	T. Clay and R. Meinertzhagen	R. Meinertzhagen Collection	M. Rothschild.
,,	1♂	*Oenanthe oenanthe oenanthe* (L.). Wheatear (♂)	April, 1947	T. Clay and R. Meinertzhagen	R. Meinertzhagen Collection	M. Rothschild.
,,	1♂	*Oenanthe oenanthe leucorrhoa* (Gm.). Greenland Wheatear	April, 1947	T. Clay and R. Meinertzhagen	M. Rothschild Collection	M. Rothschild.
,,	3♂, 1♀	*Passer domesticus domesticus* (L.) House Sparrow	April 21, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
Dasypsyllus gallinulae Dale (1878)	1♂	*Acrocephalus schoenoboenus* (L.). Sedge Warbler (♂)	April, 1947	T. Clay and R. Meinertzhagen	R. Meinertzhagen Collection	M. Rothschild.
,,	1♂, 1♀	*Emberiza citrinella citrinella* L. Yellow Hammer	April 19, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
,,	1♀	*Motacilla alba alba* L. White Wagtail	April 25, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
,,	1♀	*Phylloscopus trochilus trochilus* (L.). Willow Warbler	April 25, 1935	W. H. Pollen	British Museum Collection	F. J. Cox. Seen by M. Rothschild.
,,	1♀	*Turdus merula merula* L. Blackbird (♂)	April, 1947	T. Clay and R. Meinertzhagen	R. Meinertzhagen Collection	M. Rothschild.

TABLE II.—*Bird* Hosts of* Ceratophyllus borealis *Roths.* (1907).

Name of host.	Localities.	Total number of records from each host.	Location of specimens.	Published record.
Oenanthe oenanthe (L.). Wheatear (Scottish records as *Saxicola oenanthe*)	Ollaberry, Shetland Isles } Scotland Gluss Vol. } Scotland	2 } 9	British Museum (J. Waterston Collection)	Waterston, 1914
	Inishtrahull Isles, Ireland	1	British Museum (received from E. O'Mahony)	O'Mahony, 1942
	St. Mary's, Scilly Isles, England	1	British Museum (received from H. Slater)	Present paper.
	Parwich, Derbyshire, England	1	G. B. Thompson Collection (not seen by the author)	Thompson, 1937.
	Island of Ushant, France	4	R. Meinertzhagen Collection M. Rothschild Collection	Present paper. Present paper.
Larus argentatus Pont Herring Gull	Todhead, Kineff, Scotland	1† } 2	British Museum (J. Waterston Collection)	Waterston, 1910 and 1914.
	St. Agnes, Scilly Isles, England	1	F. A. Turk Collection	Turk, 1946.
Alauda arvensis L. Skylark	Haylor, Shetland Isles, Scotland	1	British Museum (J. Waterston Collection)	Waterston, 1914.
Anthus spinoletta (L.) (as *Anthus obscurus*). Rock Pipit	Haylor, Shetland Isles, Scotland	1	British Museum (J. Waterston Collection)	Rothschild, 1913, Waterston, 1914.
Anthus pratensis (L.). Meadow Pipit	Island of Ushant, France	1	R. Meinertzhagen Collection	Present paper.
Anthus sp.	Bernina Hospiz, Switzerland	1	British Museum (C. Rothschild Collection)	Jordan, 1923.
Cinclus cinclus (L.) (as *Cinclus aquaticus*). Dipper	Berwick, Scotland	1†	British Museum (J. Waterston Collection)	Waterston, 1914.
Cuculus canorus L. Cuckoo	Island of Ushant, France	1	M. Rothschild Collection	Present paper.
Delichon urbica (L.) House Martin	Inishtrahull Isles, Ireland	1	E. O'Mahony Collection	O'Mahony, 1942.

Fratercula artica (L.) Puffin	St. Mary's, Scilly Isles, England	1	F. A. Turk Collection (not seen by the author)	Turk, 1946.
Montifringilla nivalis (L.) (as "Snowfinch"). Snowfinch	Drei Zinnen Hut, Dolomites	1	British Museum (received from K. Jordan)	Jordan, 1928.
Motacilla alba L. White Wagtail	Baeir, near Isafjordur, Iceland	2	Hamburg Museum (identified by J. Wagner. Not seen by the author)	Henrikson, 1939.
	Grof, Skaftartunga, Iceland		? (Identified by C. Lindroth. Not seen by the author)	Lindroth, 1931.
Motacilla flava L. Yellow Wagtail	Island of Ushant, France	1	R. Meinertzhagen Collection	Present paper.
Passer domesticus L. House Sparrow	Island of Ushant, France	1	R. Meinertzhagen Collection	Present paper.
Phalaropus lobatus (L.). Red-necked Phalarope	Barie, near Isafjordur, Iceland	1	Hamburg Museum (identified by J. Wagner. Not seen by the author)	Henrikson, 1939
Phoenicurus ochrurus (Gm.) (as *Ruticilla titys*). Black Redstart	Haute Savoie, France	1	British Museum (received from K. Jordan)	Present paper.
Pyrrhocorax graculus (L.). Mountain Chough	Zermatt, Switzerland	1	British Museum (C. Rothschild Collection)	Rothschild and Jordan, 1920.
Sterna macrura Naum Arctic Tern	Tinga Skerry, Shetland Isles, Scotland	1	British Museum (J. Waterston Collection)	Waterston, 1914
Sula bassana (L.). Gannet	Isle of St. Kilda, Scotland	1	British Museum (C. Rothschild Collection)	Rothschild, 1907

Unless otherwise stated all the specimens recorded in this table have been examined by the author.

* There is also one record from a Vole (*Evotomys* sp.) from St. Moritz, Switzerland, and from an unknown host from Iceland in the British Museum (C. Rothschild Collection). Lindroth records one specimen taken "in the Grass" in Iceland.

† Atypical specimens.

TABLE III.—*S. Nordberg's Records of* C. borealis *from Finland.*

Host (named by author).	Locality in Finland.	Number of records for each host.	By whom identified. (Location of specimens not known.)	Published record.
Alauda arvensis L. Meadow Lark	Jomala	2 nests (2 nests examined)	Nordberg	Nordberg, 1934 and 1936.
Anthus pratensis (L.). Meadow Pipit	Jomala	3 ,, (3 ,, ,,)	,,	,, ,,
Anthus spinoletta (L.). Rock Pipit	Helsingfors ?	4 ,, (6 ,, ,,)	,,	,, ,,
Accipiter nisus L. Sparrow Hawk	Jomala	1 nest (6 ,, ,,)	,,	,, ,,
Falco peregrinus Tunst. Peregrine Falcon	Helsingfors ?	1 ,, (3 ,, ,,)	,,	,, ,,
Fringilla coelebs L. Chaffinch	{1 Kuopio, 1 Helsingfors ?	2 nests (24 ,, ,,)	,,	,, ,,
Motacilla alba L. White Wagtail	{8 Helsingfors ?, 1 Nystad	9 ,, (9 ,, ,,)	,,	,, ,,
Passer domesticus L. House Sparrow	{1 Marieham, 1 Kuopio	2 ,, (6 ,, ,,)	,,	,, ,,
Pica pica (L.). Magpie	1 Marieham	1 nest (6 ,, ,,)	,,	,, ,,
Pyrrhula pyrrhula (L.). Bullfinch	Marieham	1 ,, (3 ,, ,,)	,,	,, ,,
Sylvia borin (Bodd.). Garden Warbler	Helsingfors ?	3 nests (3 ,, ,,)	,,	,, ,,
Turdus pilaris L. Fieldfare	{1 Sakkola, 1 Nystad	2 ,, (13 ,, ,,)	,,	,, ,,
Turdus philomelus Brehm. Song Thrush	Helsingfors ?	2 ,, (11 ,, ,,)	,,	,, ,,
Turdus musicus L. Redwing	Marieham	1 nest (3 ,, ,,)	,,	,, ,,
Turdus merula L. Blackbird	{2 Helsingfors ?, 1 Marieham	3 nests (3 ,, ,,)	,,	,, ,,

and Coll, Aran Isles (Ireland), Scilly Isles and Alderney (Channel Isles). This is strikingly similar to *C. borealis*, which is recorded from Shetland (not Orkney Isles), St. Kilda, Inishtrahul (Ireland), Scilly Isles, and Island of Ushant (Brittany). Both can be described as "fringing distributions."

Whereas *B. smithianus* and *C. borealis* are absent from the Orkneys, both *B. muscorum* and *C. garei* are established there and in the Inner Hebrides. On the other hand the latter has, unlike *B. muscorum*, penetrated as far as the Shetland Isles, which constitutes the only area apart from Iceland and possibly Finland where the two species of fleas are found together. Richards suggests that a parallel exists between the distribution of the two species of bees and certain species of voles (*Microtus* and *Clethrionomys* = *Evotomys*). Fossil remains provide indispensable evidence regarding the latter, "which enables one to define them as species which have retreated* before an invading fauna and have only survived in a fringe of western fastnesses."

It is interesting to speculate whether the same theory can be applied to the case of the two fleas. The distribution of *C. borealis* certainly parallels that of *Bombus smithianus* and also shows several features characteristic of relic faunas.

The circumpolar distribution of *C. garei* (Jordan, 1932; Wagner, 1930) is not, on the other hand, comparable with that of *Bombus muscorum*. Nevertheless it appears reasonable to conclude from the existing data that *C. garei* reached the mainland of Great Britain and France first, and from there has spread outwards to the various islands, including the Orkneys and Shetlands, gradually replacing *C. borealis* in much the same manner as *B. muscorum* has replaced *B. smithianus*. Richards (1935) has pointed out (p. 84) that the detailed explanation of the geographical distribution of both these bees and the voles is not yet possible owing to our ignorance of certain geological problems connected with the severance of the islands from the mainland of Britain. In the case of the fleas the lack of knowledge is even greater, for scarcely anything is known about the biology and ecology of the fleas themselves. The relationship with the hosts, which are often migratory birds wintering in Asia and Africa, greatly complicates the problem. In the case of closely related bird fleas such as *C. borealis* and *C. garei* with an apparently similar habitat, it is possible to imagine *C. garei* gradually replacing *C. borealis* everywhere over a wide geographical area, except perhaps on one host like the Wheatear, to which *C. garei* might be less well adapted. It is not unusual to find two closely related parasites, one of which is found on a variety of hosts, while the other is restricted to a single species. *Ceratophyllus gallinae*, the commonest bird flea in Britain, for example, has been recorded from nearly 100 different hosts, whereas *C. rossittensis* Dampf (1912), a species extremely closely allied to it, is restricted to the Carrion Crow (*Corvus corone* L.) and Hooded Crow (*Corvus cornix* L.). There is, of course, no evidence how such speciation arose.

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* In a footnote Richards points out that the term "retreat" is used metaphorically. "The voles were once spread over the British Isles and have only become extinct on the mainland. The fringe is what is left and is not made up of individuals who were driven there."

Apart from any other angle of the problem further collecting is required, especially in key positions such as the Highlands of Scotland and Northern Ireland, in order to obtain exact information regarding the status and distribution of the intermediate and atypical forms of *C. borealis* from the mainland (see above, p. 85). Until then explanations of this interesting distribution can be little more than amusing conjecture.

ACKNOWLEDGMENTS.

My sincere thanks are due to Miss Theresa Clay, Colonel Richard Meinertzhagen, D.S.O., and Capt. W. H. Pollen for collecting the fleas in Ushant. I would also like to express my gratitude to Dr. E. O'Mahony and Dr. F. A. Turk for their great kindness in lending me specimens from their collections, and to Dr. K. Jordan, F.R.S., for discussing the problem with me.

REFERENCES.

EWING, H. E., and IRVING FOX (1943), The Fleas of North America. *Bull. U.S. Dep. Agric.*, Miscellaneous Publication No. 500, 142 pp., 13 figs.

HENRIKSEN, K. L. (1939), *The Zoology of Iceland*, **3**, Part 47, Siphonaptera.

JORDAN, K., and N. C. ROTHSCHILD (1920), A Preliminary Catalogue of the Siphonaptera of Switzerland. *Ectoparasites*, **1** : 78–122, 23 figs.

Idem (1923), Additions to the Catalogue of Swiss Siphonaptera. *Ibid.*, **1** : 278–289, 1 fig.

JORDAN, K. (1928), Siphonaptera collected in the Dolomites. *Novit. zool. Tring*, **34** : 173–177, 6 figs.

Idem (1932), Siphonaptera collected by Mr. C. Elton in Lapland. *Ibid.*, **38** : 258–260, 1 fig.

LINDROTH, C. H. (1931), Die Insektenfauna Islands und ihre Probleme. *Zool. Bidr. fran Uppsala*, **13** (Siphonaptera), 334–335.

NORDBERG, SVEN (1934), Aphanipterologisches aus Finnland. 1. Verzeichnis der bisher in Finnland gefundenen Aphanipteren nebst Diagnosen über 8 für die Wissenschaft neue Arten. *Mem. Soc. Fauna Flora Fennica*, **10** : 354–369, 15 figs.

Idem (1936), Biologisch-ökologische Untersuchungen über die Vogelnidicolen. *Acta Zool. Fennica*, **21** : 1–168, 4 figs., 20 diagrams.

O'MAHONY, E. (1942), Notes on Irish Siphonaptera : V. *Ent. Mo. Mag.*, **78** : 199.

RICHARDS, O. W. (1935), *Bombus muscorum* (Linnaeus) and *B. smithianus* White (Hym.). *Trans. Soc. British-Ent.*, **2** : 73–85, 1 pl.

ROTHSCHILD, N. C. (1902), New British Fleas. *Ent. Mo. Mag.*, **38** : 225, 1 fig.

Idem (1907), A New British Flea. *Ibid.*, **43** : 11, 1 fig.

Idem (1913), Description of the Male of *Ceratophyllus borealis* Roths. (1906). *Ibid.*, **49** : 24, 1 fig.

THOMPSON, G. B. (1937), The Parasites of British Mammals and Birds. XIII: Records of Siphonaptera Bred from Birds' Nests. *Ibid.*, 72 : 105–107.

TURK. F. A. (1946), The Siphonaptera of Cornwall and the Isles of Scilly with the Description of a New Sub-species. *Ibid.*, 82 : 97–100, 1 fig.

WAGNER, J. (1930), *Katalog der palaearktischen Aphanipteren*, 55 pp.

Idem (1937), Aphanipterologische Notizen. *Konowia*, 16 : 252–257, 5 figs.

WATERSTON, J. (1910), On Some Habits and Hosts of Bird Ceratophylli taken in Scotland in 1909; with a Description of a New Species (*C. rothschildi*) and Records of Various Siphonaptera. *Proc. Roy. Phys. Soc. Edin.*, 18 : 73–91, 6 text-figs.

Idem (1914), Some Records of Scottish Siphonaptera. *Ent. Mo. Mag.*, 50: 159–166.

Ashton Wold,
Peterborough.

NYMPHALIS ANTIOPA HIBERNATING.—Whilst moving some wood in my garden at Stanmore on February 15 this year, I discovered a male of *Nymphalis antiopa* on the underside of a log. When touched, it fell over as if dead, but if left a few minutes regained its resting position. I am leaving it in an outhouse to see whether it will survive the winter.—R. D. HILLIARD; 54, Gyles Park, Stanmore, Middlesex, February 18, 1948.

VANESSA ATALANTA HIBERNATING IN SUSSEX.—On January 24, 1948, I was in a clearing of an oak wood near Arundel at noon. The day was mild and sunny. On tapping a bunch of oak leaves, a specimen of *Vanessa atalanta* flew out, and proceeded actively to disport itself in the sunshine. *Nymphalis io* and *Aglais urticae* were also on the wing at the same time. My note-book also records *V. atalanta* in an adjacent wood in similar conditions on January 30, 1944. These two notes may be of interest as adding to the evidence that some *V. atalanta* survive a mild winter in the south of England.—Comdr. G. W. HARPER, R.N.

DANAUS PLEXIPPUS IN W. SUSSEX.—Mr. G. V. Vredenburg recently told me, and asked me to report, that on September 17, 1947, at Pagham he watched two *D. plexippus* flying in the late afternoon about a quarter of a mile from the sea. He had no net, as he no longer collects, but there can be no possible doubt as to the correctness of his identification.—E. W. CLASSEY; 5, Carlton Avenue, Feltham, Middx.

AESHNA MIXTA IN N. LINCOLNSHIRE.—During the late afternoon of September 2, 1947 (a bright and hot day), I caught a female *Aeshna mixta* near Gainsborough, Lincolnshire. The insect was flying in the same spot where I had noticed earlier in the day a female *Aeshna cyanea*, and because of this I mistook it for the latter species. The smaller size and generally browner appearance attracted my further attention, however, and prompted me to capture the insect. I do not know of this dragonfly having being noted previously in N. Lincolnshire or elsewhere in the county, and would be pleased to hear of any existing records. Miss Longfield does not include Lincolnshire in her reference to the species, and Lucas comments on the few records of this dragonfly from anywhere.—GEORGE E. HYDE, F.R.E.S.; 20, Woodhouse Road, Doncaster.

NOTES ON A NEW SPECIES OF *AËDES*, SUB-GENUS *MUCIDUS* (DIPTERA: CULICIDAE) FOUND IN MAURITIUS.

By S. Gebert,

Entomologist, Medical and Health Department, Mauritius.

In 1927, the year of the creation of a special Malaria Branch of the Medical and Health Department in Mauritius, extensive searches of mosquito breeding-grounds were made all over the island. During the searches, in the Black River district, which forms the warm south-western part of the island, the writer came across a large pupa in a pool of stagnant rain-water in which were breeding both *A. gambiae* and *Aëdes fowleri*. The pupa was taken to the laboratory, and when it hatched out, two days later, produced a beautiful male *Mucidus*. As it was a unique specimen a photograph of it was made and sent to the late Dr. F. W. Edwards for his opinion. He naturally replied that it was difficult to give a precise opinion from a photograph, but that it might possibly be a new species. The specimen was eventually damaged so that no worth-while description could be made.

Years then went by and, although extensive searches were made in all parts of the island, no *Mucidus* larvae were ever found until July of last year, when twelve were collected, in the same district, from a pool of stagnant water in which were, as before, *A. gambiae* and *Ochlerotatus nigeriensis*. The pool was in a region which was being thoroughly investigated in connection with experiments on the use of D.D.T., and it was the luck of Mr. V. Payandee, one of the able "moustiquiers" on the staff, whom I sent to the pool, to come upon the larvae. They were taken to the laboratory and fed until pupation took place, and from the pupae six perfect females and one male were obtained. The others hatched out with difficulty and became damaged.

Before proceeding with the descriptions, I wish to say how grateful I am to Dr. H. D. Tonking, the Senior Pathologist of the Central Laboratory, for having placed a room at my disposal to enable me to carry out my research work in connection with the D.D.T. campaign, and for allowing me the free use of the entire laboratory. Like the others on the staff, I have been greatly stimulated by his unfailing interest in all matters connected with anti-mosquito work, and I cannot show my indebtedness better than by naming this new species *Mucidus tonkingi*.

I have also to thank Mr. P. F, Mattingley, of the British Museum (Natural History), for many helpful criticisms of which I have taken full advantage.

Mucidus tonkingi sp. n.

The largest mosquito in the island. Mounted specimens measure from 14 to 16 mm. across from one wing tip to the other. The hind legs have a length equal to that of the wing span.

♀. *Head* clothed with upright curved snow-white scales and long thin golden-brown ones, in about equal proportions ; a tuft along the median line. The scales become shorter on the lateral aspects. Eyes ringed with small short snow-white scales. Antennae golden brown with hairs of darker colour. Palpi are about three-quarters of the length of the proboscis and are covered with outstanding scales and hair. The scales are parti-coloured, golden and dark brown, on the basal segments ; mostly golden brown on the next ones and snow-white on the terminal segments. Proboscis covered with scales like those on the palpi ; the distal half has golden-brown flat scales ; the labellum is dark.

Thorax.—Scutum brown, clothed with long, thin, curved white scales among which are a few similarly shaped cream and brown parti-coloured scales and shorter creamy ones on the middle. The white scales are denser across the anterior dorsal aspect, along the anterior dorsal ridge and on the region between the wings. On each side of the scutum there is a projecting tuft in the dorso-alar region ; a smaller one in the dorso-central and another, larger, on the anterior dorsal aspect. The scales are so arranged as to leave out certain partly clothed dark areas which form a definite pattern. These patches are more or less ovoid in shape and are found in the following regions : One above each wing-base with a dark central patch between them ; one on each side of the dorso-central part ; one usually appearing as two close together, on the anterior dorsal border. Scutellum sparsely covered with long curved snow-white scales, as on the scutum, the larger ones forming a tuft on each side. Pronotal lobes with a few small flat whites cales. Posterior pronotal bristles, about 25. Pleurae clothed with short snow-white scales, the latero-ventral aspects being almost bare, as the scales are mostly on the contours ; the pro-pleura is thickly covered, as is also the latero-central part, which has, in addition to the flat scales, a tuft of long, thin, hair-like snow-white scales below the pre-alar bristles. *Wings :* Costa completely covered with short yellowish scales, among which are a few grey ones. Wing fringe with eight pale spots. *Fore-legs :* Coxae clothed with snow-white and with black forked scales and long, thin, white and golden ones. Femora covered with small flat and long outstanding yellowish-grey, sometimes parti-coloured scales except towards the tips, where there is a predominance of small white scales ; the long outstanding scales are darker on the basal half. Tibiae with two white bands of small white scales, one at the base and the other at the apex, the apical one being about three times the breadth of the basal band ; between these bands are long, outstanding parti-coloured yellowish-grey and dark-grey scales. Tarsi golden yellow with narrow white bands at the base of the first two joints ; the remaining ones are unbanded. *Mid-legs :* Tibiae with basal and apical bands as those of fore-legs and having, in addition, a few white scales, surrounding the leg, in the centre. Tarsi with narrow white bands at the base of joints 1, 2 and 3. *Hind legs:* Tibiae with three white bands of equal width covering mostly the dorsal aspect of the segment, though the middle band is also conspicuous underneath, where it shows 8 to 10 scales. The white basal band, although less apparent, is found to encircle the segment, whilst the apical band is reduced to a few scales at the tip. *Tarsi:* white bands at the bases of all joints. The first joint has a narrow band; the band on the 2nd joint is ⅓ of the length of the joint and those on the third, fourth and fifth are ½ the length. *Abdomen:* All tergites with the exception of the first completely covered with golden yellow, black and white scales. The first segment has only a few golden-yellow scales and rare white ones on the central apex; the second segment has a few white scales only on the basal centre; the third, fourth and fifth ones have triangular, basal, white corner patches, with additional median white bands, on the fourth and fifth; on the sixth the corner patches and the centre line become mixed and the seventh bears uniformly distributed scales. Segments 4 to 7 show each a pair of black dots in the centre.

♂. *Head,* like that of the female. Antennae brown with golden-brown plume hairs; the tarsus with small white scales, which are more numerous on the dorsal aspect. Palpi brown, like the antennae, but deeper coloured at the bases of the joints, the colour of the base of the first segment and of the tip of the last one being almost black; segments with flat golden-yellow scales; the second and the third segment bear narrow basal patches of 6–9 snow-white scales; there are no white scales on the rest of the segments; the second and the third segment and to a lesser extent the last one having, in addition, a small patch of outstanding black ones on the apices; plume hairs partly dark brown on the first segment, the rest being golden-brown like those on the antennae; the apical segment is twice the length of the penultimate one. Proboscis with short, thick, golden-yellow scales, as on the palpi, and long thin ones; the tip dark.

♂ holotype, ♀ allotype, and paratypes are kept at the Central Laboratory, Redent, Mauritius.

The species differs from *M. scatophagoides* in the absence of a middle white band on the fore-tibiae and on the first hind tarsal segment, and in the absence of basal white bands on the distal joints of the fore-tarsi and on the penultimate and ultimate ones of the mid-tarsi; and from *M. mucidus* in the presence of basal white bands on the first two segments of the fore and the first three of the mid-tarsi, and in the absence of the numerous white scales clothing the segment of the male palpi.

I do not think that this species is of medical importance. All attempts to induce the females to bite, either by day or by night, have failed. On the other hand, they fed readily on diluted honey.

I am indebted to Dr. L. Rathier du Vergé, the acting Director of the Medical and Health Department, for permission to publish this paper.

LITERATURE CONSULTED.

EDWARDS, F. W. (1911), The African Species of *Culex* and Allied Genera. *Bull. Ent. Res.*, 2 : 246.

THEOBALD, F. V. (1913). New *Culicidae* from the Soudan. *Ann. Trop. Med. Para.*, 7 : 591.

EDWARDS, F. W. (1923), A Synopsis of the Adult Mosquitoes of the Australian Region. *Bull. Ent. Res.*, **14** : 367.

Idem (1924), Mosquito Notes V : *ibid.*, **15** : 261.

BARRAUD, P. J. (1928–29), A Revision of the Culicine Mosquitoes of India. *Ind. J. Med. Res.*, **16** : 1052.

NOTES AND OBSERVATIONS.

THE SEASONAL ABUNDANCE OF LYCAENA PHLAEAS.—To my earlier letter (1947, *Entom.*, **80** : 114) relating to the seasonal fluctuations of *Lycaana phlaeas*, I would like to add a further comment. As mentioned previously, 1946 was the worst year I remember for this species, and I have since gathered from other collectors that the butterfly was rare in many areas during that lean season. Because of this I was particularly pleased to see upwards of a dozen specimens on the wing in a single afternoon in late May, 1947. Owing to circumstances I was not able to re-visit the locality concerned until mid-June, when no more *L. phlaeas* were noticed. On a very hot day in mid-July several newly-emerged males were noticed, but subsequent visits during the following month produced disappointing results, and only very limited numbers of the butterfly were seen. The laggards of the brood continued on the wing until late August, when fresh specimens started to appear and quickly became more numerous. The species was very abundant during the whole of September and the first half of October, after which cooler weather conditions started. Variation was chiefly in the direction of heavier than normal markings on the fore wings, and several interesting striated forms were caught. The tendency to reduction in the area of copper on the hind wings was less frequent than usual, but three examples of var. *lacticolor* (1 male and 2 females) all in first-class condition were taken. In mid-October there was evidence of more newly-emerged males, but a cold night at the time seriously depleted the butterfly generally and it never recovered. The species was certainly unusually common in many places in S. Yorks, N. Lincs and N. Notts in the late summer and early autumn of 1947.—GEORGE E. HYDE, F.R.E.S.; 20, Woodhouse Road, Doncaster, November 20, 1947.

LATE BROOD OF COLIAS HYALE.—On September 15 of last year I took, in a field not far from Folkestone, a pair of *C. hyale*, and put the female in a breeding cage in company with two *C. croceus* var.

helice. Between them they deposited, on lucerne and medick, some 150 ova, the majority of which hatched within a fortnight. Unfortunately the small larvae did not flourish. Green-fly attacked the food-plants which were growing in pots and sucked the juice out of the leaves. The larvae lacked the intelligence to transfer themselves to unaffected leaves, with the result that most of them perished through inanition before the green-fly were destroyed. Many of the survivors were devoured by three small spiders which had concealed themselves in the cage and grew exceedingly fat before they were discovered. The consequence was that not more than 20 of larvae grew to any size, and these grew very slowly during the cold spell in the autumn, when the temperature in the cage could not be kept at more than 65° F. However, 12 of them pupated between November 9 and 20. Of these pupae 2 died, 5 produced imagines, the first on November 15, and the last on December 1, and 5 were sent to Col. F. A. Labouchere. From these he bred 5 imagines, of which 2 emerged on December 3, and 1 on December 12. My impression was that larvae of *C. hyale* hibernated when quite small, and as none of these larvae showed any tendency to hibernate, I assumed that all the pupae were of *C. croceus*; it was therefore a considerable surprise to find that all the ten imagines were *C. hyale*. These were on the whole rather more faintly marked than specimens taken during the summer, and the last to emerge were of less than normal size. It was remarkable that the females emerged before the males and greatly outnumbered them. Of the 10, 2 only were males, apart from one about the sex of which I am not yet certain. So far as I can ascertain, this is most unusual behaviour on the part of *C. hyale*.—A. M. MORLEY; 9, Radnor Park West, Folkestone, February 27, 1948.

SYNTARUCUS TELICANUS HÜBNER (LEP. LYCENIDAE) IN MALTA.—This is an additional butterfly to the Rhopalocera of the Maltese Islands. It has not been recorded before, at least it is not included in *The Lepidoptera of the Maltese Islands*, by the late Paul Borg, 1932, nor in any previous list. I noticed it for the first time in 1944 in a limited number. Last year and this year the number has increased immensely, and at present wherever there is a *Plumbago Zeylanica*, flights of this butterfly were noticed from July to October. I thank very much Dr. Corbet, of the British Museum (Natural History), for naming it.—ANTHONY VALLETTA, F.R.E.S.; 214, Msida Street, B'kara, Malta.

VANESSA CARDUI IN MARCH.—*V. cardui* was on the wing here on March 11.—E. CRISP; High Street, Heathfield, Sussex.

[This report and the next make one wonder whether all the *Macroglossum stellatarum* reported in March were in fact hibernators. That the exceptional weather may have induced an early movement from abroad seems a possibility.—ED.]

HELIOTHIS PELTIGERA IN MARCH.—I took a specimen of *Heliothis peltigera* flying over sallow near here shortly after dark on March 13. This seemed a very early date for this migrant, but I suppose it is possible that it had emerged from the pupa in England. The moth is in good condition and is of the usual early summer form.—C. S. H. BLATHWAYT; 27, South Road, Weston-Super-Mare, Somerset.

OURAPTERYX SAMBUCARIA IN DECEMBER.—A moth sent me in December last for identification proved to be *O. sambucaria.* It had been taken alive on December 1 in Westminster.—N. D. RILEY

FOOD-PLANT OF HORISME TERSATA.—In spite of Mr. Postan's inability to rear this species on *Clematis* (1946, *Entom.*, **79**: 288), I think it must be the common food of this species, which was very abundant in my garden at Sutton, Surrey, year after year, though there were few buttercups except in a closely mown lawn. The wild *Clematis* grew over a hedge there, and I reared a large brood of the moth on the leaves, from the egg.—CYRIL I. PATON; 23, Arbory Road, Castletown, Isle of Man.

HIBERNATION OF PLUSIA FESTUCAE.—Can anybody tell me where the larva of this species hibernates in the wild ?—P. B. M. ALLAN; 4, Windhill, Bishop's Stortford, Herts.

LAPHYGMA EXIGUA AT EGHAM, SURREY.—On the night of August 21 I took a fresh female of this migrant at light in my room here.—C. G. M. DE WORMS; Milton Park, Egham, August, 1947.

AN ABNORMAL GALL OF CONOPIA FLAVIVENTRIS.—Mr. R. Fairclough and I recently spent some time searching among the sallows on the damper parts of the local heaths for the galls of *C. flaviventris.* One we found was remarkable in shape and size; its length was 2½ in., and the maximum diameter nearly 1¼ in., while the stem on which it had formed was only a little over ½ in. thick. Feeling convinced that it was just a large and malformed swelling caused by *Saperda populnea* we cut it open; to our great surprise we found inside no less than three fine, healthy looking Clearwing larvae, each occupying a vertical gallery of its own near the centre. This is the first instance I have seen of more than one larva of this species inhabiting a single gall, though very occasionally I have found two galls on the same stem not more than an inch or two apart.—R. W. PARFITT; 4, Brind Park Terrace, Sandhurst, Camberley, Surrey.

FORCING HERSE CONVOLVULI.—Before and after 1901 the capture of the larva of this fine immigrant Hawk-moth has been an uncommon enough event to merit particular notice. But I cannot find much news of the after-history of those one hundred or more larvae taken in that exceptional year; nor, in fact, of any of the odd ones found at other times. Did they live to produce the moths, and if so what sort of treatment did they have? Presumably moths deriving from larvae and pupae taken early in the season, say in July or August, or even in the early days of September, would emerge in September or October after a very brief pupal life, and probably without the stimulus of forcing, and without much loss. (A note by J. Hy. Fowler, 1901, *Entomologist,* **34**: 320, is interesting, and easily the most informative.) But those maturing later, say in late September or early October, and destined to lie over winter, present a more difficult problem. From the little evidence available one gathers that this delicate pupa, like that of *Acherontia atropos,* is unable to survive an English winter, and that "forcing" is one's only hope of rearing the moth from a late pupa. On October 3, 1947, Mr. J. Powley, of this town, brought me a full-fed larva of *H. convolvuli*. It was of the dark form, and well advanced towards pupation. He had found it the same day walking across the path in his garden. I placed it immediately on damp peat soil in a medium-size flower-pot. It lay absolutely inert on the surface for a day and a half before burrowing to pupate at the bottom of the pot. The cocoon was a roomy, weak-walled cell, exactly like that of *atropos*. The pupa, 53 mm. in length, was of rather slender proportions. It was for most of the time amazingly lively and, in its earlier days, shared with *atropos* the odd habit of nervously twitching the abdominal segments with a kind of telescopic action, but this special activity ceased as soon as the moth began to form up. The pupa was successfully forced near my sitting-room fire, in a small pupa cage of the pattern described in a former article of mine (1941, *Entomologist*, **74** · 88). The pupa enjoyed nothing beyond atmospheric moisture, provided by a little tray of wet moss on the bare floor of the cage; there was never actual contact with damp earth or damp moss. The temperature ranged between 65° F. and 90° F., but was as far as possible kept in the region of 80° F. (a minimum early morning temperature of 65° F. was ensured by removing the cage each night to a shelf just above the heat-outlet of a gas-operated refrigerator). Under these simple conditions the moth began to form up about December 2, and emerged in the late evening of December 20—a perfect, though rather small, male. Its wing-span is 104 mm., or just over 4 in. The richly-mottled fore wings make it a very handsome moth. Dr. Neville Birkett watched this experiment with keen interest, and I am grateful to him for some useful suggestions.—FRANK LITTLEWOOD; 34, Aynam Road, Kendal, Westmorland.

A NOISY MOTH—EUPREPRIA PUDICA ESPER.—Besides *Acherontia atropos* there occurs in Malta another moth which emits a rasping noise while flying, namely, *Euprepria pudica* Esper a tiger moth called in Maltese 'Zarzur,' an onomatopoeic word. This moth appears in considerable number after the first rains, in autumn, and is thus very common in October and November, especially at dusk. The larva appears as early as in January, but it is not common before March, when it is seen basking in the sunshine on rubble walls. It is brown all over, and like the caterpillars of other Arctiidae is very hairy. It feeds on *Urtica urens* and is easily bred.—ANTHONY VALLETTA, F.R.E.S., 214, Msida Street, B'kara, Malta.

[Our own *Arctia caia* frequently makes a rasping noise when moving its wings. This may not have been recorded previously.—H. B. D. KETTLEWELL.]

THE ORIGIN AND HISTORY OF THE BRITISH MACRO-LEPIDOPTERA.—Professor J. W. Heslop Harrison's review of this paper (*Entom.*, **81**: 46–8) contains much useful information. There is no doubt that when definite information on the exact status of many varieties, of the type given by Professor Harrison, and on the distribution and biology, is published the revision of the histories of many species will be necessary. For this reason it is hoped that further criticisms and suggestions will be forthcoming. I must comment, however, on Professor Harrison's broader criticisms, as there are several points made in the paper which he appears to have overlooked in preparing the review. Firstly, it is not correct to say that I assume that no species of Lepidoptera dates from before the Upper Pleistocene as an inhabitant of the British Isles. I could find no satisfactory evidence indicating that any species dates *wholly* from before that time, but I made it clear (p. 285) that many species probably have inhabited the British Isles continously since earlier in the Pleistocene, some possibly since the Pliocene. Secondly, there are reasons for suspecting that all the species given in the list on pp. 279–280 are occasional or regular migrants. Of the eight species to which Professor Harrison draws attention, seven have been captured at light-ships at distances of between 7 and 30 miles off the English coasts (see Downes, *Trans. R. ent. Soc. Lond.*, **92** : 129-142), while the eighth (*Actebia praecox*) has been captured on a number of occasions many miles from suitable breeding-grounds. As these species are known to fly considerable distances, at least occasionally, it is possible that they could have traversed the comparatively short sea-barriers separating the Hebrides from the mainland in the early post-glacial. However, as I pointed out in the paper (p. 357 and elsewhere), I am of the opinion that the majority of the suspected migrants spread into Britain via land-connections and that subsequent oversea migration has been negligible in importance. Thirdly, the occurrence in the Outer Hebrides and in the Rhum and Coll groups of so many species for which there is otherwise no good evidence that they were other than post-glacial arrivals in the British Isles, is explained in two ways (see pp. 343–4). Some may have arrived by oversea flight in the post-glacial, as did *Maniola jurtina*, while the Hebridean populations of others may be of Pleistocene age. This does not necessarily mean that I disagree with Professor Harrison's theory, that the Outer Isles and the Rhum and Coll groups were connected to the mainland in the post-glacial; I am open to conviction on this point. But if these post-glacial land-connections did exist they must have been severed long before the separation of Ireland from Great Britain and of Great Britain from the Continent. Perhaps Professor Harrison could be persuaded to publish a detailed discussion of his views on the origin and history of the Macro-Lepidoptera of all the Western Isles. In conclusion I would like to thank Professor Harrison and others who have sent me criticisms, comments and suggestions on the paper, as the information will be valuable in future work.—BRYAN P. BEIRNE.

NEPTICULA DECENTELLA AND LITHOCOLLETIS GENICULELLA IN CHESHIRE.—In recording the occurrence of these two moths at Frandley, Cheshire, in the *Entomologist* (1948, **81** : 6), my friend, Mr. A. W. Boyd, asked whether they have occurred in other northern counties. The latter species occurs quite freely on scrub sycamore in the wood adjoining my garden at Madeley, in the extreme north-west corner of Staffordshire, close to the Shropshire and Cheshire borders. I first noted it in 1936. Two years later, in company with my friend, Mr. R. G. Warren, I found a mine in the Coombe valley, near Leek, on the eastern side of the county. Since then, Mr. Warren has seen more mines and imagines in the same locality and at Trentham, Needwood Forest, and Moddenshall, near Stone also near Chesterfield, Derbyshire. I have never taken *Nepticula decentella* H.-S., perhaps because I have not definitely searched for it, but will do so as the food-plant is quite a common tree here.—H. W. Daltry; Bar Hill, Madeley, Crewe.

Late Record of Arctia caia.—On November 15, 1947, at Wilmslow, Cheshire, I found a single female of this species in quite good condition. The date is the more remarkable because of the preceding cold weather, despite which, the moth was quite lively when taken off the warm side of a wall in the early morning sun.—M. Locke, 36, Ainsdale Road, Ealing, W. 5.

SOCIETIES.

South London Entomological and Natural History Society. —*November* 26, 1947.—The President, Mr. L. T. Ford, B.A., in the Chair. *Gifts* to the Society's collections: (i) By Mr. J. W. Saunt, a longicorn beetle recently taken in the Isle of Wight, and thought to be new to science; (ii) by Mr. S. Wakely, a series of *Blastobasis decolorella* Wollaston (Lep., Blastobasidae) from Herne Hill, London. *Exhibits.*—The President, on behalf of Mr. S. Wakely, *B. decolorella* and *B. lignea* Walsingham; Mr. C. E. Easterling, a specimen of *Colias croceus* ab. *helice,* lacking yellow spots in the black margin; Mr. R. L. E. Ford, a living *Macroglossum stellatarum* recently taken in fresh condition; Mr. E. Wild, a very small and pale *Agrotis upsilon*; Mr. L. G. Payne, carabid beetles taken in June, 1947, in upper Teesdale, N. Yorks, namely *Bembidion stomoides* Dej., *Patrobius assimilis* Chaud., *Nebria gyllenhali* Schoen., and *Carabus glabratus* Payk.; Col. F. A. Labouchere, *Colias hyale* and *C. australis* Verity from Kent and from the Sierra Nevada, Spain. The President read on behalf of Mr. S. Wakely a paper on the Occurrence of *Blastobasis decolorella* Wollaston in South London, and Mr. S. N. A. Jacobs read notes on the moths of the family Lamproniidae.

December 10, 1947.—The President, in the Chair. *Exhibits.*—Mr. S. N. A. Jacobs, specimens of *Etainia* (*Nepticula*) *sphendamni* Hering, a recent addition to the British List, together with British and Danish *E. sericopeza* Z. for comparison; Mr. M. A. E. Gardner, *Coccinella septempunctata* ab. *anthrax* (Col.) from Wicken Fen, Cambs, August, 1939; Mr. E. W. Classey, watercolour paintings of various forms of the larva and imago of *Rhodometra sacraria*; Mr. F. D. Buck, a collection of Coleoptera from Epping Forest. Mr. F. D. Buck also read a paper entitled Some Notes on the Coleoptera of Epping Forest.—T. R. Eagles, *Editor*, 32, Abbey Road, Enfield, Middlesex, January 6, 1948.

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WEST HERTFORDSHIRE LIGHT TRAP, 1947.

BY J. H. AND P. J. BELL.

THESE records are in continuation of those published in 1946 (*Entomologist*, **79** : 273).

The dry summer of 1947 following the snows and floods of a quite exceptional winter might have produced a series of extraordinary results amongst Lepidoptera. That this on the whole was not so was shown by the results obtained by our West Hertfordshire light trap. The year did, indeed, prove better for many species than 1946, an unusually wet and miserable year, but generally not so good as 1945. The percentage of good nights (warm and still) was relatively high and, with the exception of one or two chilly spells, the weather militated towards continuity of records.

The number of species that attended compared favourably with 1946 but, generally speaking, numbers of individuals were not so great. As far as times of emergence went most species were up to, but not greatly in advance of, average.

In certain instances the conditions caused an extra brood to be produced, as in the case of *Hygrochroa syringaria*. Normally this is a single-brooded species, although a second brood may be produced in confinement. In 1947, however, the second brood was on the wing in September, specimens appearing in the moth trap from the 3rd to the 13th of that month. The last specimen of the normal brood had been recorded on July 3rd. This second generation of *H. syringaria* approximated closely in relative size to the normal summer specimens of the allied *Selenia bilunaria* var. *iuliaria* and *Selenia tetralunaria* var. *aestiva* ; i.e. it is about three-fifths of the size of the specimens of the first brood and is far more constant in size than they are.

Another single-brooded species producing a second brood was *Euproctis similis*, of which considerable numbers were attracted by light in the second half of September. *Nola cucullatella* did the same thing, although the September brood was weak. Previously a negligible number of second-brood *Ectropis bistortata* arrived at the trap, but this year specimens attended throughout July.

On the other side of the picture a number of species, especially Agrotidae, appeared to be adversely affected, *Citria lutea*, *Cirrhia icteritia* and *Agrochola lota* being examples. *Plusia gamma*, after enjoying an excellent year reinforced by immigrants in 1946, fell to an eighth of the last year's total this year.

We had our sprinkling of interesting migrant species. *Laphygma exigua* appeared in August and September to a total of four, while *Nycterosea obstipata* arrived on July 26 (1), September 9 (1), and October 13 (3), and *Rhodometra sacraria* on September 19 (1) and October 13 (3). Other interesting visitors not previously recorded included *Plusia festucae* and *Orthonama lignata*.

We append the relative 1947 figures for those species for which 1945 and 1946 details were in our previous note:

	1945.		1946.		1947.	
	Nights present.	Total number of specimens.	Nights present.	Total number of specimens.	Nights present.	Total number of specimens
Cilix glaucata	58	492	35	232	32	111
Leucania pallens	52	447	43	210	68	309
Leucania impura	55	516	34	139	41	100
Opisthograptis luteolata	51	245	47	127	30	59
Calothysanis amata	68	275	35	97	64	144
Chiasma clathrata	51	201	32	95	27	71
Diataraxia oleracea	36	170	40	178	52	180
Xanthorhoe fluctuata	77	329	73	314	72	187
Caradrina alsines	32	711	44	818	53	713
Plusia gamma	43	272	73	314	22	37

Dudswell Rise,
Northchurch, Berkhamsted,
Herts;
December 18, 1947.

NYMPHALIS ANTIOPA AND N. POLYCHLOROS IN EAST KENT.—About 11.30 a.m. on August 31, 1947, when I was cycling from Whitstable to Canterbury, a fine *N. antiopa* with a white border flew with me for some twenty yards before disappearing over the hedge bordering the road. I stopped, but I did not have another glimpse of it. On Good Friday, March 26, 1948, in hot sunshine but with a chilly S.E. wind, at 2.30 p.m. I sighted *N. polychloros* just past Ashford on the Canterbury side, but it very soon disappeared over some trees. I stayed in the vicinity for about 1½ hours in a small wood, and sighted another *polychloros* along a small path, flying in the sunshine. At about 4 p.m. towards Canterbury a third *polychloros* was seen on the wing by the edge of the road. The following day I visited a wood near Canterbury. There was a strong, chilly S.E. wind blowing, but amongst the more sheltered parts the sun was very warm. On my arrival I noticed an excellent female *N. polychloros* on the road. I was able to pick it up by hand; presumably it had been knocked down by a passing vehicle and was just recovering. Another *polychloros* was seen nearby, bringing the total of the two days up to five. Previous to this my only earlier record of this insect was March 26, 1946, exactly two years before.—D. D. BOWDEN; 276, Northdown Road, Cliftonville, Margate, March 31, 1948.

THE ENGLISH COLONIES OF *EREBIA AETHIOPS* ESPER.

By J. E. H. Blackie.

The Scotch Argus certainly survives in one of its English localities and may possibly do so in one or two others. The following summary of the information I have been able to obtain may be of interest:

1. Lancashire.

Colne.—Newman and Barrett mention a record for 1859, deriving apparently from Edwin Birchall. Mr. A. E. Wright, whom I consulted on this, says: "With regard to the Colne record I consider this should be ignored. I know the district well and there is no suitable ground thereabout for *aethiops.* It must have been carried there by some agency from Grassington."

Carnforth.—In Ellis' *Lepidoptera of Lancashire* it is recorded from Warton Crags in 1905 by Dr. Hodgson. This is 3–4 miles from Arnside Knott. No other mention of a colony there can be discovered and the Ellis record gives no indication of status. Possibly it was a single wind-blown individual.

Silverdale.—Newman in *British Butterflies* gives it as abundant on the authority of J. B. Hodgkinson. Arnside is so close that one may assume that the present very restricted colony on the Knott was formerly more widespread, and covered the southern slopes of the hill on the Silverdale side.

Grange-over-Sands.—There are many old records and the localities were, apparently, Grange Woods and Yewbarrow. It has been extinct there for a long time, and attempts made in 1931, 1932 and 1941 to re-introduce it from Arnside were complete failures, as Mr. A. E. Wright informs me. Mr. William Mansbridge thinks that these Grange colonies were wind-blown offshoots from Arnside across the estuary, and attributes their disappearance to the depredations of schoolboy collectors, but the Witherslack colony (*q.v.*) was once well-established, and its disappearance is not generally considered to have been caused by over-collecting.

2. Westmorland.

Arnside Knott.—The colony survives and appears to be flourishing. Mr. H. Rowland-Brown (*Entom.*, **52**: 265) records that it was remarkably restricted when he visited it in 1918. I noticed the same thing in July, 1947, when the males were quite common in one small area and completely absent 100 yards away in any direction.

Witherslack.—This once flourishing colony disappeared for unknown reasons about 1914.

3. CUMBERLAND.

I can only find two records. Newman records one from Coldbeck on J. B. Hodgkinson's authority, and Ford (1945, *Butterflies*) one taken at Keswick in 1899 and now in his own collection.

4. YORKSHIRE.

Whernside.—Barrett (1893, *British Lepidoptera*, **1**) mentions this as a locality, but I can find no other reference to it.

Grassington.—Great interest attaches to this colony because a distinct local form seems to have evolved there (v. Ford, *Butterflies*, 290). It is difficult to discover what has happened to it. Porritt (*Yorkshire Lepidoptera*) recorded *aethiops* as abundant there in 1903. About 1914 Mr. W. G. Clutten found it still common. In 1916 or 1917 Mr. A. E. Wright visited the place with Mr. Clutten and they could find no trace of the butterfly, but according to Ford (*l. c.*) Mr. Clutten found it not uncommon in 1923, and Mr. William Mansbridge tells me that it is still there. When basic petrol returns it may be possible to investigate. Meanwhile, if it survives, the seclusion of Upper Wharfedale may be healthy.

5. DURHAM.

The famous locality was Castle Eden Dene, and a full and enjoyable account of the butterfly and its haunts may be found in Newman's *British Butterflies*. In 1918 Prof. J. W. Heslop Harrison wrote (*Entom.*, **52** : 38) : "Now practically exterminated. . . . On the last occasion I looked for it I found one solitary individual near Thornley and Wellfield stations in its old haunts." He goes on to give a scathing account of the reckless collecting to which the insect was subjected. When I inquired of him (1947) of its ultimate fate he wrote : "Has gone completely as a result of over-collecting."

6. NORTHUMBERLAND.

Prof. Heslop Harrison writes that it was recorded in 1860 from Fawdon, and that in 1924 it was discovered not far away in fair numbers. "As far as I know it is still there" he adds.

It is encouraging to note that *aethiops* still survives and flourishes in its best known and most accessible haunt in Westmorland, and it is much to be hoped that any which may exist in Yorkshire and Northumberland will be left in peace. It seems reasonable to suppose, from the evidence given, that if left undisturbed the butterfly would from time to time establish new colonies and that the existing ones might enlarge their boundaries, but its hold at present must be considered precarious, and reckless collecting might easily exterminate it south of the border.

Butterflies at Water during the Hot Summer of 1947.—In view of previous notes on this subject, the following observations may be of interest:—August 11: *Pieris napi* was observed drinking at the edge of a woodland puddle on Bookham Common, Surrey. August 17 While watching swallows drinking on the wing by dipping into a large pond, I was surprised to see *Aglais urticae* do the same. There were quite a few of this species flying in the vicinity of this pond, although many were merely settling and drinking from the edge. However, one flew over the surface of the water, circling round for a few seconds and then deliberately dipped into the water. Presumably the water retained on the body is then sucked up by the proboscis. A friend who was with me at the time remarked that he had seen *Pararge megera* do the same thing a few days previously. These observations were made during a hot spell of weather, there having been no rain for several weeks. August 19: Almost a dozen *Vanessa atalanta* together with *A. urticae* drinking from freshly laid concrete. August 19: A *Plusia gamma* attracted by light was caught in a damp glass, and before it was liberated it was seen to drink from the beads of water on the glass. August 31: Five *Pieris rapae* grouped together were drinking from wet mud at the edge of a pond at a brickfield. *Polygonia c-album* was observed doing the same later, at the same pond.—B. R. Stallwood; 19, Southfield Gardens, Strawberry Hill, Middlesex.

Vanessa atalanta Settling on Wet Tar.—A few weeks ago I saw two specimens of *Vanessa atalanta* alight upon a freshly tarred and sanded road in the S.E. area of London. Being at a loss for an explanation of their extraordinary conduct I disturbed them in order to try to discover whether the remains of a squashed fruit or some other delicacy had attracted them. I was unable to detect anything on the road, and on progressing further along detected another specimen, probably one of the original pair, fluttering closely over the road as though selecting some suitable spot on which to alight. Unfortunately a car came along at that moment and I was unable to investigate further. I can only imagine that some attractive substance may have been spilt upon the gravel while stacked at the roadside, but even in this eventuality cannot understand how it could possibly overcome the strong odour of hot tar.—Wm. G. StJohn; 1a, Belvedere Court, Belvedere Terrace, Brighton, Sussex, September 22, 1947.

MIGRATION RECORDS, 1947.

By Capt. T. Dannreuther, R.N.

(Concluded from p. 83.)

Pieris rapae.—Probably due to natives being reinforced by immigration in July, many thousands were recorded, notably at Hove, Aldershot, and Bradwell (Essex); in August around Plymouth, Yeovil; in September at Bolsover (Derby) and Ilfracombe. In general, attacks by larvae were abnormally severe and more widespread than *P. brassicae* and in all provinces lasted longer than the latter (H. M. Edelsten). The migrating swarms were often of mixed species of Pieridae, sometimes including *Colias* and associated Vanessids.

Pieris napi.—The only record of this species alone is of over 7000, mostly fresh, which remained only one day in Monk's Wood, a mile west of Wood Walton in Huntingdonshire (H. A. Leeds). In other cases *P. napi* was only a small percentage of other Whites.

Agrotis ipsilon.—Unusual crowds were noted at sugar in September at Timoleague (Co. Cork) with *P. meticulosa* (Mrs. G. E. Lucas). On September 17 before midnight at Bull Point Lighthouse (N. Devon) many thousands, perhaps a myriad, with very few *P. gamma* in company, flying N.W. with equal proportion of *Peridroma porphyrea* passed the light like a snowstorm leaving 300 settled on the lantern from which specimens were collected for Rothamsted Experimental Station. It may be noted that 50 *A. ipsilon* got to Keiss, Caithness, on September 25 (A. W. Godfrey).

Amathes c-nigrum.—On September 16 at 02.30 B.S.T., several hundreds appeared at the Bull Point Lighthouse, near Ilfracombe, about 50 settling on the lantern 160 feet above sea level. No definite flight direction was noted but the wind was south 3 (A. W. Godfrey).

Hadena suasa Borkh.—The Dog's Tooth was abnormally abundant all over East Kent at sugar in August "possibly due to immigration" (A. Richardson).

Hapalia ferrugalis.—With no direct record of immigration, the Rusty Dot has been reported in extraordinary abundance. From June it was very common at light at Glenageary, Co. Dublin (E. S. A. Baynes). From October 15 to November 21 at Timoleague, Co. Cork, it was "in countless numbers" and one survived indoors to December 31 (Mrs. G. E. Lucas). From November 1 to 22 at Maidencombe, near Torquay "normal numbers earlier, simply filled the moth trap varying from 200 to 600 a night instead of a few dozens" (F. H. Lees). It had first appeared with *N. obstipata* on June 14, in the moth trap. At Bull Point Lighthouse, N. Devon, on November 6 midnight to 4 a.m. about 300 appeared at the lantern from which 50 were sent in for examination; some *Dasypolia templi* were in company (A. W. Godfrey).

Plutella maculipennis.—At Bournemouth on May 30 large numbers were found in garden "too many for a local hatch" (W. Parkinson Curtis).

Acrolepia assectella.—No extension of range reported, but at Worthing and Southwick "phenomenal numbers emerged from seed heads of leeks and there was damage in allotments" there and elswhere in Sussex (B. D. Moreton).

IV. *Rare Vagrant Insects Recorded in* 1947.

Danaus plexippus.—Six seen. On May 29 at Dorking, on a hot afternoon (temp. 86° F.) one was seen zigzagging slowly up and down a hillside and examined close to three times (A. A. W. Buckstone). (Early records are rare: in 1935 it was recorded at Brighton on March 21 and at Lulworth on April 21.) On August 16 members of the Annfield Plain Naturalists' Club, visiting fields east of Satley in N.W. Durham, saw one flying into the field after a man had reported, by description, one in his garden a day or two before (F. Wade, *Entom.*, **80** : 255). On September 13 at Bickenhall, Somerset, a male was seen settled on a grass stem and flew away south (A. H. Turner). On September 17 at Pagham (W. Sussex), two watched by G. V. Vredenburg (*Entom.*, **81** : 95). On October 17 at Lustleigh, S.W. of Exeter, one was seen settled on Michaelmas daisies and flew off straight to S.E. (Capt. J. W. G. Coverton, *W. M. News*, January 6 1948),

Argynnis lathonia.—One seen in Lamorran Woods, S.E. of Truro, on August 23 (R. M. Simons, *Entom.*, **80** : 268). Another seen close to June 3 at Fairlight, Hastings, on cliff above beach (A. Denby Wilkinson). A female taken at Buckland, near Yelverton, on September 1 settled on Fleabane (J. G. M. Scott, *Entom.*, **80** : 268). A female in fair condition measuring 54 mm. taken on Buddleia in a garden at St. Leonards-on-Sea on September 22 by a schoolboy (R. Mason). Another female taken in good condition on October 1 at Bassaleg, near Newport, Monmouth. It was ovipositing (A. R. L. Palmer). Five seen, three captures.

Nymphalis antiopa.—42 records in 1947 as compared with 35 in 1945 and not equalled since the 47 recorded in 1880; but nothing like the 436 in 1872. The first was seen at Scleddau, near Fishguard, flying west on June 29 (H. J. Evans). The last was seen at Northiam in Sussex, on November 1 (A. Townsend, *Times*, Nov. 20) On September 20 one was seen at the Greeba Curragh the first record for the Isle of Man (G. Clementson). The farthest west was one seen on August 24, on seashore near Bannow, Co. Wexford (Mrs. Langham, *I.N.J.*, 9 : 4 : 99). On August 9 one was flying east at Gorran Haven, Cornwall (F. Lea). Distribution of other records were 8 in Norfolk, 3 in Suffolk, 2 in Essex, 2 in Notts, 3 in Kent, 5 others in Sussex, 2 in Hants, 2 in Surrey, 2 in Berks, and single records in London, Oxford, Wilts, Cornwall (Falmouth), Cheshire, S. Yorks and E. Lothian. Twelve were captured.

Pontia daplidice.—Five captures from eight seen. July 9 at Southend (A. F. Common); July 25, August 3, 31 and September 15, captures in Kent. August 22 seen near Jevington (Sussex), August 30 at Keneggy, near Penzance; last taken at Lymington about Ocotber 1.

Papilio machaon gorganus.—Between July 2 and September 2 four seen in Kent at Sheerness, Kingsdown and Orpington. On August 7 one at Cerne Abbas, Dorset (*Entom.*, **81** : 23).

Celerio galii.—On August 19 at Walcott, Norwich, one taken on Petunia at night (J. S. Philbrick). On August 26 a full-grown larva found in an oat field at Scousburgh, Shetland Is. (G. D. Morison).

Celerio lineata livornica.—Thirteen captured and a few more seen. Larvae found at Tunbridge Wells and Penzance which emerged mid-August. First moth seen on May 13 at Timoleague, Co. Cork (Miss B. Donovan), and a female taken at Minehead (Som.) same day (C. N. Hawkins). In May numbers seen at flowers in Tonbridge and Southborough. In May or early June three taken in Hants. In August captures were made at the Lizard and Bull Point Lighthouse. In September males were captured at Horam (Sussex), Plymouth and the last on 17th at Seahouses on the Northumberland coast (Eva Milliken, *Nature Lover*, **4** : 190). Four captures. One found on Blackpool Promenade in July (*Country Life*, **14** : 22)

Daphnis nerii.—Four. One Captured on Blackpool Promenade in July (*Country-Side*, **14** : 220). At Chat Moss, near Manchester, early in September a slightly worn specimen picked up by boys in a potato field (*Entom.*, **81** : 23); another in a field by the Manchester Ship Canal about October 3 (*The Field*, February 28, p. 244); and on October 17 a male of 4½ in. expanse captured at a shop in Barrow-in-Furness (G. Sykes, photo in *N.W. Evening Mail*, Oct. 22).

Lithosia quadra.—Ten captured at Hailsham and Arundel, July 23 to 28 (B. Embry). At Seapoint, Co. Dublin, a male taken in light trap in August (Dr. B. P. Beirne).

Utetheisa pulchella.—August 11 near midnight at Bull Point Lighthouse a good female was captured and identified by Curator, Ilfracombe Musuem, the first record since 1930 (A. W. Godfrey).

Leucania l-album.—Two or 3 second brood came to light trap in October, at Maidencombe, Devon (F. H. Lees).

Leucania unipuncta.—Female taken at Arundel, July 14 (G. Haggett), and a male at Pembroke Dock, August 24 (G. J. T. Jose) at light.

Leucania albipuncta.—Four captures at light: July 31, Arundel (G. Haggett); August 9, Foxhall Heath, Suffolk (A. E. Aston); August 11, Dungeness (A. M. Morley); October 11, Framlingham, Suffolk (*Entom.*, **81** : 24).

Caradrina ambigua.—One taken at sugar at Lulworth on September 17 (R. W. Parfitt).

Laphygma exigua.—Eighty-one recorded of different broods from end of June, the last emerging on September 16 at Reading, where more than 30 moths seen and larvae common (L. H. Williams). At Seapoint, Co. Dublin, 11 moths taken in light trap between June 12 and September 20 (B. P. Bierne). Similarly, in August, 7 were taken at Stowmarket, Suffolk, 5 at Bradwell (Essex), 5 at Lulworth in September and 2 at Maidencombe on October 12. Eighteen others found singly—May 29 at Bull Rock Lighthouse, Co. Cork (J. O'Brien) being the first.

Heliothis dipsacea.—August 8 at Stanton St. John (Oxon) one in clover field (A. M. Emmet); August 14, one taken in light trap at Harpenden (C. B. Williams); August 9, 17, 25, five at light near Reading (L. H. Williams).

Heliothis peltigera.—Twelve moths recorded between June 10 at Deal and September 3 at Saltdean, near Brighton. Other records from Dorset, Wilts, Pembroke, Warwickshire, Yorks, Surrey and Berks. At Eastbourne about September 9 larvae in all stages found on *Senecio viscosus* : out of 100 many were stung, but one bred emerged October 4 (B. Embry). At Hull, larvae found on mangold failed to pupate (D. Wade).

Heliothis armigera.—One taken at Tooting Bec Common on October 10 (L. Christie).

Plusia ni.—On October 9 a female taken in moth trap at Maidencombe, S. Devon (F. H. Lees).

Catocala fraxini.—On August 31 near Minchinhampton (Glos) one taken (A. Richardson). On September 12 at Bromborough, Cheshire, a boy found one on a gate-post (S. Gordon Smith).

Rhodometra sacraria.—1947 was "the great Vestal Year": about 1250 recorded with the previous maximum of only 33 in 1867. Summing up notes appearing in the *Entomologist*, it is here only proposed to show the distribution. It first appeared on

April 30 in a N.E. gale, at Trevose Lighthouse, a specimen being found dead on the ground (P. J. Rashleg, Principal Keeper). The next was taken in a light trap at Blandford, Dorset, a fresh female (J. Howell). The northern range is shown by a male taken at Castletown on November 7, the first in the Isle of Man (C. I. Paton). In Co. Cork six were taken from October 26 to November 10 (Mrs. Lucas).

From first week of September to last week of October over 500 were taken in West Sussex in the stubble of harvested wheatfields with broods appearing on *Polygonum aviculare* or *P. persicaria* (E. W. Classey and G. Haggett). Between October 1 and 10 in stubble fields around Freshwater, Isle of Wight, Dr. H. B. D. Kettlewell and Dr. E. A. Cockayne took over 250 from which 2000 were bred. Maximum density reported is shown by 50 being found in 150 acres of stubble at Fordingbridge, Hants, on September 20 by Col. C. W. Mackworth-Praed (*Entom.*, **80** : 271). Many were bred in Hampshire and Gloucestershire, with broods emerging on November 5, December 11 and January 20, 1948 (A. Richardson).

Distribution by counties was as follows: Sussex 560; Hants 310; Dorset 210; Kent 27; Suffolk 23; Berks 19; Surrey 18; Co. Cork 6; 4 each in Wilts, Herts, London and singly in Middlesex, Bucks, Warwickshire, Flint, Denbigh and Isle of Man (*Entom.*, **81** : 45).

Nycterosea obstipata (*P. fluviata*).—The 66 maximum year of 1945 has been eclipsed by 239 recorded in 1947, mostly through local breeding. Earliest capture on Worplesdon Hill, Woking, April 25 (J. Howell, *Entom.*, **81** : 72); first male appeared at Brockenhurst on May 6 (Dr. J. A. Walker) and the last, very worn, on November 22 at Maidencombe, Devon (F. H. Lees). Most observers using light traps were rewarded this season. The largest concentration was reported at Iâl in Denbighshire, where "50 came to light on October 13, and a further 62 on October 18, all in bred condition" (F. Gordon Smith). Similarly in Co. Dublin at Seapoint and Glenageary between May 28 and October 4, 40 were taken in a light trap (Dr. B. P. Beirne). Distribution of other records by counties shows: Devon 26; Essex 14; Hants 9; Sussex 7; Berks and Somerset 5 each; Co. Cork 4; Kent, Flint and Dorset 3 each; Suffolk 2; Cheshire, Glos, Oxford and Co. Wicklow, one each. Some larvae were found at Polzeath in Cornwall (Capt. R. A. Jackson).

Eublemma parva Hb.—In Isle of Sheppey a female came to light on June 30 (Dr. J. A. Walker, *Entom.*, **80** : 229). First Irish record at Newcastle, Co. Wicklow, a female found in grass on seashore on August 18 (Dr. B. P. Beirne).

Eublemma ostrina Hb.—First Irish record: a female found in morning of June 10 resting outside a light trap (Dr. B. P. Beirne).

Margarodes unionalis Hb.—At Leigh-on-Sea, Essex, on August 28, a fine fresh male came to light (D. Smith, *Entom.*, **81** : 8).

Itame fulvaria Vill. (*T. brunneata* Thun.).—A male taken on June 7 in Pine Wood, near Canterbury (J. Parry, *Entom.*, **80** : 141, and 226).

Anania nubilalis Hb.—From earlier immigration, has become common in Essex in colonies on mugwort since 1938, at Benfleet, and Southend to Shoeburyness (H. C. Huggins, *Entom.*, **80** : 206).

Arctornis l-nigrum Müller (*Leucoma v-nigrum* Fb.).—At Bradwell-on-Sea, Essex, six males taken June 27 to July 1 in moth trap (A. J. Dewick).

Loxostege palealis Schiff.—At Hastings on June 20, 3 to 5 p.m., many came in from sea flying lazily 3 feet above the water in ones and twos of both sexes quite fresh in calm weather (R. L. E. Ford).

Dasypolia templi Thun.—On November 6, midnight to 4 a.m., about a hundred settled on lantern of Bull Point Lighthouse, N. Devon, and specimens identified at Rothamsted Experimental Station. They were in company with about 300 *H. ferrugalis* (A. W. Godfrey).

V. *Immigrant Insects other than Lepidoptera*, 1947.

Sympetrum striolatum nigrifemur.—From mid-August to mid-September there was an unprecedented immigration of the Black-legged *Sympetrum* flying north from sea into the southern coast of Ireland. They were recognized by Miss C. Longfield, who was present, as all of the intermediate type known in Spain. With the records collected by A. W. Stelfox, of the National Museum in Dublin, Miss Longfield has written a full account of this unique invasion of dragonflies to appear in the *Irish Naturalists' Journal.* Here are some of the details. In the mid-August anti-cyclone at Courtmacsherry and Garretstown, Co. Cork, " clouds of dragonflies were seen coming in from the sea " (W. and R. Barrett). Around Timoleauge, from August 24 to September 20, the dragonflies were " especially abundant in fields, some lingering to November 23 " (Mrs. G. E. Lucas). Off the coast and in Roaringwater Bay large swarms were " ovipositing in tandem in the sea " on August 31 and September 2 (J. E. O'Donovan). On September 2 at Sandy Cove, Kinsale Harbour, " very large numbers came in from sea following the coast line and watched for five minutes in dense formation about a foot apart crossing a road 50 feet above the sea, 2 to 8 feet above ground, flying northwards " (Mrs. C. E.

Dorman). On three days. September 7 to 14, "large numbers came in from sea like midges from Rosslare towards Wexford Harbour, Co. Kildare" (E. S. A. Baynes). On September 21 dragonflies were swarming and flying north or N.W. through Prosperous in Co. Kildare (E. S. A. Baynes). It is thus clear that the main swarms of myriads, if not millions, came in between Cape Clear and Knockadoon Head first and others later on the Wicklow to Wexford coast.

Sympetrum fonscolombii.—At Frensham Great Pond, Surrey, two mature males captured on August 13. One bred at Hawley emerged a female on July 24 (A. W. Richards). On September 27 at Rye Harbour, E. Sussex, a teneral female obviously locally bred was caught by hand in a gravel pit (N. W. Moore).

Sympetrum flavoleum.—About 60 recorded between July 29 and August 30 at Wood Green (Middlesex), Battle (Sussex), Cockfosters and Epping Forest, Hertford Heath, Frensham Little Pond (Surrey), Sedlescombe (Sussex), Kingsley, near Bordon (Hants), Swanscombe (N. Kent), New Forest and Alderfen Broad (Norfolk), recorded by 9 Odonatists.

Locusta migratoria.—About February 20 at Aylesbury, a live specimen was found in a crate of cauliflowers on arrival from Bologna (Miss C. Baker, Aylesbury Museum). In August Dr. Uvarov was sent a specimen of the Black Sea race from Somerset. From August 5 to 18 ten of the Gironde Estuary race came in to various places in Devonshire with a late one at Teignmouth on October 9. One or two came in to Falmouth on September 10 (B. Rickless). In the Isle of Wight one came in to Bembridge on August 14 and a male to Newton Saltings on August 27 (A. McClelland). During a *P. rapae* immigration at Pett Level (E. Sussex), one came in on August 23 identified as of the French race (R. Cooke).

COLORADO BEETLES.—Several hundreds reported to N.A.A.S. mainly near Tonbridge and the Home Counties (*Times*, May 30 to June 10).

GREEN APHIS.—Myriads settled over H.M.S. Scott at sea 20 miles east of Spurn Point, Yorks, in July (Lieut. D. R. Benson, R.N.).

HOVER FLIES.—A swarm of thousands visited Owers Light Vessel off Selsey Bill in calm during night of August 11/12 (S. G. Sharman).

SAW FLIES.—*Athalia rosae,* probably immigrant or wind borne, swarmed in Channel Is., Chichester and Surrey to Kent (B. D. Moreton).

VI. *Migration Notes from Abroad*, 1947.

CHANNEL ISLANDS.—Jersey: A few *N. antiopa* and one *E. argiades* seen. Migrants normally present (W. J. LeQuesne). In August one *Locusta migratoria* killed by dog (R. J. Tanner).

Guernsey: In September many *V. atalanta* came in from sea on south side of island; but from September 24 to October 4 on Spur Point there was a regular trickle flying south to France (J. R. LeB. Tomlin).

SARK: From May 11 at the cliff at La Coupee there was a remarkable concentration of *M. stellatarum* (C. J. Shayer).

FRANCE.—In the Landes district of S.W. France, millions of *Locusta migratoria* migrated eastwards to the Haute Garonne, doing much damage in summer (Mrs. V. M. Muspratt).

SWITZERLAND.—At Zuoz, 9000 feet, in the Engadine, many *P. brassicae* were flying north above the snow line on June 26 (C. F. Tebbutt). In the Grindelwald, September 14 to 30, thousands of *M. stellatarum* were in flight up the Eiger Mountain (Col. Logan-Home). In August at Martigny, Rhone Valley, *C. hyale* was commoner than *C. croceus*, but not numerous and none at Chamonix (Dr. E. Scott), at Zürich *M. stellatarum* common October 5 (H. Sieber).

MEDITERRANEAN.—Off Malta on October 2 a dozen *M. stellatarum* were met off Malta in H.M.S. London (Lt.-Comdr. J. Blake, R.N.). H.M.S. London on passage from Malta to Port Said on October 9, when 150 miles north of Benghazi with a light N.N.W. wind, saw 3 *C. hyale* and 3 *M. stellatarum* which passed from astern (Comdr. E. H. Johnson).

"Windycroft,"
Hastings, Sussex;
April 9, 1948.

METRIOPTERA ROESELII (ORTH., DECTICINAE) IN KENT.—In Whitstable south area I took a female on August 1, 1946, and a male August 18, 1946. This is the first time for the last 10 years I have met with this grasshopper. Other members of the family, viz. *Leptophyes punctatissima*, *Meconema thalassina*, *Pholidoptera cinerea* (*L.*), *Platycleis grisea* (Fabr.), also occur in the area.—P. F. HARRIS; Ledgepoint, Millstrood, Whitstable.

LEPIDOPTERA VISITING FLOWERS.—Mr. Axel Andersen, of Odensegade 7^{II}, Ö, Copenhagen, Denmark, writes to ask if anyone in this country will combine with him in undertaking a survey of Lepidoptera visiting flowers. In particular he wishes to get details of numbers of visits per flower, species of flower visited, colour, etc., and of the ecology of the situation where the observations were made, e.g. meadow, garden or hillside, etc. All communications should be addressed to him as above.—ED.

BRITISH LEPIDOPTERA COLLECTING, 1947.

By C. G. M. de Worms, Ph.D., F.R.I.C., F.R.E.S.

The year 1947 opened with a spell of reasonably fine weather, which enticed out a few of the early species of Geometers such as *Erannis leucophaearia*, *Theria rupicapraria* and *Phigalia pedaria*, but it was all too short-lived. On January 20 there set in a bitter wind which was the prelude to probably the most severe cold period for at least fifty years, lasting without a break till almost the middle of March. Week after week passed when no outdoor collecting of Lepidoptera was possible, and there were many who felt that the unremitting cold might have a serious effect on the earlier insects, but as soon as the winter yielded on March 12 the moths, which had been biding their time, suddenly burst forth with a rush in great numbers.

On March 16 near Folkestone *Erannis leucophaearia* was quite numerous on oak trunks and there were a few *Phigalia pedaria* on street lamps, while *Erannis marginaria* was in profusion the following evening on Horsell Common. On March 22 a very fine and warm afternoon, the oaks round Caesar's Camp on Wimbledon Common were plastered with *E. leucophaearia* of all forms and a fair proportion of f. *marmorinaria* and f. *merularia*. I found a single male *Apocheima hispidaria* just emerged on an oak trunk at 4 p.m., also a lot of *Achlya flavicornis* at rest on birches and fences. All these species as well as *Theria rupicapraria* appeared on the night of the 23rd on Horsell Common, where *Brephos parthenias* began emerging on the 25th.

Not much else was seen until the beginning of April. On the 1st, a very fine day, there was a profusion of *Gonepteryx rhamni.* The sallows, however, were very backward, and did not start to bloom till the middle of the month. At Conway on Good Friday, April 4, I searched in vain with Captain Jackson for *Nyssia zonaria.* We had another abortive search for it on the 5th and on Easter Sunday, during the afternoon of which I re-visited the Sychnant Pass after a break of seven years. Much diligent search under very stormy conditions yielded only a single small larva of *Noctua ashworthii*, a few minute *Agrotis agathina*, and an occasional *Dyscia fagaria* (*belgiaria*).

On the 8th I reached Aviemore. About mid-day I found a male *Brachionycha nubeculosa* just emerging at the foot of a birch half way up the wooded slope. The cold spell had also evidently retarded the emergence of this fine insect. That evening I saw some twenty of the large northern form of *Achlya flavicornis* at the lamp. The 9th was a very sunny day. Searching fences in the late afternoon produced seven sprawlers, all males, also a few of the bright Scottish *Brephos parthenias*, while after dark lamps attracted quite a small host of *A. flavicornis*, a few *Malenydris multistrigaria* and half a dozen male sprawlers, but the fickle weather changed for the worse, and the next two days provided little fresh. On April 11 I made a day's outing to Struan, but only found one male *Poecilopsis lapponaria* and several *A. flavicornis*. That evening saw the first *Orthosia incerta* at the sap runs and a good many more on the 12th, together with *O. gothica* and *Calocampa vetusta*. There were still some fresh sprawlers on fences, trunks and at lamps, while *A. flavicornis* and *B. parthenias* were abundant everywhere, but spring larvae were very scarce and small. There was no sign of *Endromis versicolor*, which did not eventually appear till early May.

When I returned to Horsell on April 16 I found the sallows at their best. That evening I saw *Orthosia stabilis*, *O. incerta*, *O. gracilis*, *O. cruda* and *Pachnobia rubricosa*. The next evening Mr. R. Bretherton and I went to Effingham Common, where we were glad to find *Aleucis pictaria* (*Bapta distinctata*), very fresh and easy to box off the small sloe bushes. *Selenia bilunaria* and *Earophila badiata* were also quite plentiful.

On April 18 I paid a week-end visit to Mr. Austen Richardson at Minchinhampton, but it was very chilly that evening, and we drew almost a complete blank at the sallows in that neighbourhood. The following afternoon we made an expedition to the Forest of Dean, in which geometers taken at rest included dark forms of *Ectropis bistortata* and of *Eupithoecia abbreviata* as well as normal *Nothopteryx carpinata* and *Coenotephria nigrofasciaria*. We proceeded to Symonds Yat, arriving about dusk, and shortly after 10 p.m. found the sallows well patronized by a very good assortment of moths, including a dozen *Pachnobia leucographa*, several *P. rubricosa* and *Orthosia miniosa*, and some very fine pale and spotless forms of *O. munda*. Lamps and headlights were not less productive, as we saw seven male *Polyploca ridens* and many melanic *E. bistortata* and *E. abbreviata*. Altogether it was a most successful outing and well worth the effort.

Lycia hirtaria began appearing in London in mid-April, and continued in good numbers until the end of the month. My next week-end journey, on the 26th, took me to Micheldever. It was a glorious day, which attracted out many of the spring butterflies, but on a tour of the district in the afternoon the only find of interest was a number of stems of *Viburnum* containing *Aegeria andrenaeformis*, of which I spotted by the caps four inhabited ones on one bush. The night was very unproductive at light. On the 27th I travelled to the New Forest, where Mr. R. Burton joined me at

Brockenhurst. We were horrified to see how much the Woodfidley and Denny wood area had been devastated. There was very little vegetation for insects. We could not find a single larva of *Limenitis camilla*. In spite of the fine weather we were disappointed in the scarcity of butterflies and day-flying geometers.

The very warm spell continued well into May. On the 2nd I paid another spring visit to Mr. P. Burton at Lowestoft. The following day we made a tour of the district accompanied by Mr. Claude Morley, but neither near the coast nor in the woods round Ipswich did we see *Nymphalis polychloros*, of which several had been obtained by other collectors some ten days earlier. *Callophrys rubi* and *Celastrina argiolus* were well out, and the catkins of a fallen aspen were full of young larvae of *Agrochola circellaris* and *Cirrhia gilvago*. But on the whole the spring larvae were not very plentiful, and we only found very few small *Limenitis camilla* compared with 1946 when we visited a locality in north Suffolk on May 4. Day-flying moths were also scarce in this area.

During the ensuing week on Horsell Common searching after dark for larvae provided many *Lampra fimbria*, *Polia tincta*, and *Amathes castanea*, while the lamps attracted *Chesias rufata* on May 8 and the next night there was quite a run of insects, including *Drymonia ruficornis* (*chaonia*), *Drepana lacertinaria*, *D. falcataria*, *Cosymbia pendularia* and *Pachycnemia hippocastanaria*. The weather throughout this period was remarkably fine and warm, being the prelude to what turned out to be one of the most glorious summers of recent years.

On May 11 I led a Field Meeting of the South London Entomological Society for the second time to Alice Holt Forest, under ideal conditions. Most of the spring butterflies were well out, especially *Pararge egeria*, *Euchloë cardamines*, *Celastrina argiolus*, *Pyrgus malvae* and *Erynnis tages*. Tree-feeding larvae were once more by no means common, and hardly any *Limenitis camilla* were forthcoming from one of its usually most prolific localities. Nearly a week later, on May 17, I accompanied Mr. W. J. Kaye to the Chiddingfold district and again a very fine day favoured us. By this date *Brenthis euphrosyne* was well on the wing, as also was *Leptidea sinapis*, but apart from hosts of young *Orthosia miniosa*, larvae were as usual quite scarce compared with the previous season. The next morning Mr. A. M. Morley joined me at Horsell, and together with Mr. Russell Bretherton we made a special search of some of the local heaths for larvae of *Parascotia fuliginaria*, of which we found quite a number on fungus growing underneath a large fallen scots fir. From the birch bushes we dislodged quantities of small *Achlya flavicornis*, *Oporinia autumnata*, and a few *Hipparchus papilionaria*.

For the Whitsun holiday I joined Commander Harper near Angmering in Sussex, arriving on the evening of May 23. That night on the downs only yielded a handful of insects of no special note. The next day we made an expedition again in superb weather to the Goodwood–Petworth area. *Hamearis lucina* was common in several sheltered spots on the downs, while *Brenthis euphrosyne* was equally abundant, flitting about among the bluebells in many wooded rides and glades. Oak beating provided still further quantities of *Orthosia miniosa*, together with an occasional *Asphalia diluta* and *Thecla quercus*. On Whit-Sunday, May 25, *Brenthis euphrosyne* was even more plentiful. We also took several *Hemaris fuciformis* hovering over the bluebells. *Cepphis advenaria* was very common, not among its normal haunts of bilberry. Night work was very disappointing, owing to very low temperatures after the hot days.

The last few days of May saw some of the warmest of the year, with shade temperatures verging on the nineties. On May 30 I accompanied Mr. Morley to the Ham Street Woods, where we saw a good many insects at sugar patches, including *Tethea or* and *Apatele megacephala*, together with *Noctua rubi* and *Agrotis exclamationis*. At rest on rushes there were a good many *Brenthis selene*, while our lights attracted two female *Laothoë populi*, female *Macrothylacia rubi*, *Pterostoma palpina* and many Ermines. The shade temperature next day was 88° when I joined a large party of the Folkestone Natural History Society which Mr. C. Duffield kindly entertained at his home near Wye. It was almost too broiling to do much active collecting. However, in a couple of hours on the downs in the immediate vicinity we saw a very large assortment of Lepidoptera. The hillsides were dancing with *Zygaena trifolii*. *Siona dealbata* (*lineata*) was just emerging and could be flushed at intervals. The first *Macroglossum stellatarum* were appearing, and among the butterflies *Vanessa cardui* and *V. atalanta*, also many *Polyommatus icarus* and *P. astrarche*, but hardly any *Lysandra bellargus*. Later that day Mr. G. Youden, Mr. Busbridge and myself made the first trip of the season to Dungeness, where at 11 p.m. it was still very sultry. At sugar we drew almost a blank, but there were some interesting visitors to light, among them several *Arctia villica*, of which one male had the cream spots near the body joined in a bar. At a rather late hour some good forms of *Agrotis cinerea* and *Hadena lepida* (*carpophaga*) arrived at the lamps, while *Aspitates ochrearia* was sitting about in numbers on grass stems. The following day, June 1, was equally warm when Mr. Morley and I revisited this area. We could find only one *Hadena albimacula* on posts and were surprised that no larvae of *Lasiocampa trifolii* were forthcoming, since it had been abundant there in 1946.

June opened with some exceptionally high temperatures, over 90° in the shade. These continued well into the first week, at the end of which there began a period of cooler weather, which ushered in a remarkable spell for profusion of insects at sugar. This lasted till nearly the end of the month, and proved to be the only time throughout the whole season when the patches were really attractive, probably owing to the prolonged drought in the later months.

For the week-end starting on June 6 I went to Norfolk to stay with Mr. E. A. Ellis, who most kindly let me collect on his very fine piece of Broadland sanctuary. I had a most delightful and interesting stay of two days. On the first evening we placed our lamps on the edge of one of the big marshes, but did not have many unusual visitors up till 2 a.m. At dusk we had seen *Plusia iota* and *Mysticoptera sexalisata*. Sugar proved the chief attraction. *Anaplectoides prasina*, *Apamea unanimis*, *Apatele rumicis*, *Apamea rurea*, *A. hepatica*, *A. nebulosa*, and *Euplexia lucipara* were the most notable visitors to it. We made a tour of the marshes the next morning, when I have never seen anything like the profusion of small larvae and ova of *Papilio machaon*, of which many imagines were on the wing, but there were few other butterflies on the move. Among day-flying moths we only flushed *Procris statices*. The night of June 7, again very warm and moist, produced almost similar species at light and sugar as before, with the addition of *Tethea or*, *Zanglognatha cribrumalis* and *Hadena cucubali*. Larvae seen during the visit included many *Philudoria potatoria*, *Malacosoma neustria*, several *Lithosia griseola*, *Polyploca ridens*, *Arenostola phragmitidis*, and *Orthosia gracilis*, in meadow sweet. Altogether we recorded just over fifty species of Macro-Lepidoptera during the week-end.

In Surrey the very warm conditions continued for a further week, and still prevailed when I accompanied Captain Jackson and Mr. Stanley Smith to the Bagshot area on the evening of June 12, where by dint of hard search we found several full-fed larvae of *Parascotia fuliginaria* on fallen fir tree stems. Two days later I went abroad, but on June 22 at Folkestone I broke my journey on the way back to spend an evening in search of *Arenostola morrisii*, which proved to be very numerous soon after dusk, both flying and at rest on its food-plant. Mr. R. P. Demuth, who was with me, obtained several pairs in this way on the heads of *Festuca arundinacea*.

During the last week of June sugar was very productive in the Horsell district, *Dipterygia scabriuscula* being especially common, together with *Noctua festiva* (*primulae*).

(To be continued.)

NOTES AND OBSERVATIONS.

NYMPHALIS ANTIOPA IN ESSEX.—On March 26 last, in some local woodland, to my surprise I saw a *Nymphalis antiopa*. It was under observation for quite a minute, until it disappeared into a wood. Probably it had hibernated somewhere near, as it was in quite good condition.—A. F. COMMON; 316, London Road, Westcliff-on-Sea.

NYMPHALIS ANTIOPA IN WESTMORLAND.—About midday on March 26, in cloudless weather, in a small valley called Tilberthwaite, a few miles from here, a Camberwell Beauty, worn but otherwise intact, settled on a rock for a few moments beside me. Afterwards it flew off very quickly and at a great height.—JOHN MOUNSEY; Nanny Brow, Ambleside, Westmorland.

STERILITY IN COLIAS CROCEUS.—Counting the May immigrants as the first brood, the early July as second brood, then it was the third brood, which I bred out in late August, that I could not induce to lay eggs. Mr. Pickett (a friend of Major Blackiston) brought me a typical female and one *pallida*, and I could not do any good with them. After I failed with Mr. Pickett's I went out twice and got more, but failed entirely with them. I fed them all on honey and syrup, but they died after about 8 or 10 days, and on opening their bodies I found them to be entirely empty. When caught they were beautifully fresh and were without doubt the genuine third brood, so why were they barren?—E. CRISP; High Street, Heathfield, Sussex, March 10, 1948.

[Mr. Crisp's note on his failure to obtain ova of *Colias croceus*, and on dissecting the females, his failure to find visible ova, is of considerable interest. It must be noted that this only occurred in the third brood, and that this therefore occurred late in the year. It has been repeatedly noted that other multibrooded species may lay infertile ova (or fail to lay at all) towards the end of the summer. *Herse convolvuli* is stated to lay fertile eggs only rarely from autumn immigrants, though of course this is not always the case. Mr. Lempke, of Amsterdam, states that it is the rule in Holland that females of late broods of the immigrant Hawks are infertile. In my opinion this is likely to be associated with high temperature and rapid development, and it is possible that the ova are in some primitive state and have not undergone full maturation. This has been noted in this country with indigenous species when bred at high temperatures and even under natural conditions in *Panaxia dominula* in its past locality, Tubney Wood, Oxford, and again in 1941 in stock kept out of doors by me at out-door temperatures.—H. B. D. K.]

FOOD OF COLIAS CROCEUS.—I found the note by Mr. S. R. Bowden under the above heading which appeared in the December issue of the *Entomologist* (**80**: 290) particularly interesting, for my experience in breeding this insect has been somewhat similar to his. I have frequently bred *C. croceus*, and on each occasion have found red clover unsatisfactory, usually losing over half the larvae during their first moult. On examination of the dead larvae beneath a powerful lens, together with the leaves upon which they rested, the following was revealed. The legs of these caterpillars adhered firmly to the leaves of the food-plant, due to honeydew which covered most of the plant and had evidently been caused by aphides, of which there were several occupying the clover. The larvae would undoubtedly be unable to walk or to undergo the moulting process. Many leaves were covered with a white fungus, which was also noticeable on the anal segments of many of the caterpillars, and which subsequently spread to the entire body. On one occasion I had similar trouble when using lucerne, but to a much lesser degree Further, while lucerne-fed larvae produced normal sized or exceptionally large butterflies, those resulting from clover-fed were, generally speaking, undersized, and as larvae were a great deal longer in feeding up. However, with the first moult over there was very rarely any further serious trouble.—A. A. W. BUCKSTONE; 69, Gibbon Road, Kingston-on-Thames, Surrey, January 22, 1948.

LINCOLNSHIRE BUTTERFLIES.—Two species new to me turned up in 1947 which may be worth recording. On June 1 I noticed a few *Pararge aegeria* flying among bracken in a pine wood a few miles from the town. I have visited this wood for some years and have never seen *aegeria* there before. Another newcomer to me in this district was a perfectly fresh *Polygonia c-album*, which I captured on August 27.—J. H. DUDDINGTON; 5, Normanby Road, Scunthorpe, Lincs.

COENONYMPHA TULLIA MÜLLER AND EREBIA AETHIOPS ESPER.—Being obliged to make a journey by road from Keswick to Manchester on July 22 last, I decided to try and bring off a double event by seeing, in one day, *Coenonympha tullia* in its old age and *Erebia aethiops* in its youth. The odds against my achieving this were heavy. The weather could have ruined the plan. *C. tullia* might have been over and *E. aethiops* not yet emerged. I did not know the district, had no guide, and knew no one familiar with either locality. The books are either out of date, misleading or cautiously vague, and although the *tullia* locality is easy to find, the haunt of *aethiops* is very restricted, and good luck as well as some intelligent deduction would be needed if I were to find it. I could spare only an hour in each locality, so there was no room for mistakes.

C. tullia was still about though naturally rather worn. I took six tolerable, well-marked specimens and saw perhaps twice as many again in the hour. A thorough exploration of the moss was impossible, but I saw no sign of *Plebejus aegon* in the part that I visited. I took three *Selidosoma plumaria* (*ericetaria*) and one *Carsia paludata*. Apart from *C. tullia* no butterflies were seen, though *M. jurtina* was common a few yards away from the moss, off which *tullia* never strayed.

I hurried on to Arnside to look for *E. aethiops*, and was delighted to hit on the metropolis at once and to find quite a number of males in perfect condition. I think it must have been the first day of the emergence. With great self restraint I limited my captures to two specimens. *Maniola jurtina*, *C. pamphilus*, *Argynnis cydippe*, *Aglais urticae* and *Pieris napi* were the only other butterflies noted.

With the exception of Ford (1945), recent books—Frohawk (1934), Stokoe (1938), Sandars (1939) and South (1941)—are completely out of date in their accounts of the distribution of *C. tullia* and *E. aethiops*, and even Ford is in error in saying that the former is still found in Cheshire.—J. E. H. Blackie; The Bell House, Alconbury, Huntingdonshire.

Abundance of Lepidoptera in 1919.—I am grateful to Dr. Beirne for drawing attention to a possible misunderstanding in my article. In justice to myself I may perhaps be allowed to say that, although my opportunities in that year for collecting and observing moths were limited by the regulations of a boarding-school, I did not confine my attention to the butterflies, and that my notes show that for the diurnal geometers and for such other moths as might be observable in daytime it was a pretty good year in Berkshire. But, as I feel sure Dr. Beirne appreciated, my object was not to cast doubt on his methods or conclusions, but simply to demonstrate the wide variation covered by even the most careful generalization.—J. E. H. Blackie; The Bell House, Alconbury, Huntingdonshire, March 21, 1948.

Sphinx ligustri Feeding on Forsythia.—On August 13, 1947, Mr. Etheridge brought in a larva of the above species for identification. He had found it in his garden in Gloucester feeding on Chinese bell flower (*Forsythia*).—C. Granville Clutterbuck, F.R.E.S.; 23, Heathville Road, Gloucester, September 25, 1947.

New Food-plant of Macroglossum stellatarum.—I grew a very large bed of the Red Spur Valerian *Centranthus ruber* in my garden specially for the attraction of butterflies and moths, and on July 25 I saw a Humming Bird Hawk Moth flying at the flower heads which had gone to seed. I was surprised that the insect was not visiting the plants in flower, and more surprised when it alighted on a seed-head and curved its abdomen under. When it did this for the fourth time I went forward and picked the particular portion of the plant and after careful search found a shining green egg. Later I picked all the seed heads on which I thought I had seen the insect depositing and after a prolonged search found one more egg. I could not find the other two I presumed had been laid. The larvae hatched within five days—July 30—and by August 25 were a bit more than half grown. They have been reared entirely on Red Spur Valerian. I have searched all the books at my disposal, and can find no mention of Valerian as a food-plant. *Rubia* and *Galium* are given, and I observe that the Valerianeae are the next family botanically. I shall be pleased to hear whether there have been any records in the past of the larvae feeding on Valerian, and would suggest that entomologists should watch carefully in future any *stellatarum* they observe flying at Valerian.—Clifford Craufurd; "Denny," Galloway Road, Bishop's Stortford.

THE SIESTA OF MACROGLOSSUM STELLATARUM.—This was undoubtedly the commonest Hawk Moth during the years 1943–45 at Chemulpho in Korea. In September and October I saw it flying during most hours from dawn to sunset. At dawn I saw it at rest about 8 ft. from the ground on the outside of the wooden hutments in the P.O.W. camp there, and at the same hour several others were observed feeding at *Cosmos* and *Zinnia* flowers. On September 18, 1944, two were seen to alight on a wooden hut in the shadow of the eaves. The first settled at 1.50 p.m. and stayed until 3.45 p.m.; the other settled at 2 p.m. and departed at 3.40 p.m. The weather at the time was very warm, with bright sunshine during the whole of the afternoon. At 2 p.m. (D.S.T.) near Sevenoaks, Kent, on June 3, 1947, a *stellatarum* was seen investigating an old oak bough that was projecting over a path. The moth was careering up and down this spot for a distance of 100 yards or so and always returning to the same place. I watched it for about 15 minutes and during this time it settled once, but on my moving closer it flew away, only to return a few moments later to repeat its earlier performance. Tutt in his *British Moths* (page 33) reports that he saw dozens flying aimlessly up and down a stone wall in the hot afternoon sun, occasionally resting under the stone coping, in S.E. France in 1894. He continues by stating that this habit, " whatever the cause may have been which led to it, evidently had its origin long ago."

From these observations it would appear that this species is partial to a short siesta during the early afternoon providing it can find a suitable resting site. As it is migratory and feeds during flight the fact that it does take rest during the day is not in itself of great importance, as most diurnal Lepidoptera (if not all) take short periods of rest, while feeding, etc., during the day, but it does seem to be of unusual interest that it should be so particular as to its resting site. Whenever I have seen it in flight it has always given me the impression that it was pursuing its particular business with a very definite purpose in view and not aimlessly as suggested by Tutt.—T. G. HOWARTH; Brit. Mus. (Nat. Hist.).

HIBERNATION OF MACROGLOSSUM STELLATARUM.—According to South there are few records of this insect's hibernating in England. It may therefore be of some interest to note that one was seen in my house on November 14 last, and again on December 19, that Miss Vera Day saw one flying on March 7, and that the Rev. H. W. Leach saw one in his garden on March 14.—A. M. MORLEY; 9, Radnor Park West, Folkestone, April 1, 1948.

CELERIO LIVORNICA REARED.—On May 24, 1947, a dead *C. livornica* was brought to me by Mr. D. L. Tregenza. I noticed two pale green ova attached to its abdomen. I carefully placed these into a tube for observation and both hatched on June 2. The two larvae were whitish in colour, with the head, horn, and legs black. I supplied them with dock leaves, which they relished at once. They moulted on June 9, and became blackish all over with the exception of two pale yellow longitudinal lines on each side of the body. The larvae rapidly doubled their size, being over half an inch long before moulting again on June 15. By June 20 they were ⅞ in. in length, and on the 21st they successfully moulted for the third time. The body of each larva was now black, with two yellow bands running longitudinally upon each side Between these bands the skin was speckled with yellow. The head, legs and prolegs were black, and the horn pink at the base and tipped with black. By June 27 both larvae were stationary before their fourth moult. They measured 1¾ in. in length. They moulted for the last time on June 29, grew quickly, and were just over 3½ in. long before they stopped feeding. There were 10 black crosses on the back now, and the head, legs and prolegs were black. The remainder of the body was speckled all over with yellow except the under-parts. The two yellow bands were still there but interrupted here and there, and the horn was buffish at the base, tipped with black, and having bristly hairs growing out of it. The spiracles on either side were pink. I noticed that after every moult the larva would eat the old skin that was cast before commencing on the food-plant provided.

On July 8 the fully grown larvae were placed on moss and earth. Both constructed a frail cocoon out of moss on the surface. They pupated on July 16. The pupae were pale green, but changed to a brownish colour within a few days. A fine female emerged on August 12, and a male on August 13.—Dennis E. Bowden; 6, Trewarveneth Street, Newlyn, Penzance, Cornwall.

SYNANTHEDON CHRYSIDIFORMIS.—A specimen of the above, in good condition, visited Privet blossom in my garden about noon on July 6, 1946, and was captured.—P. F. Harris; Ledge Point, Millstrood, Whitstable.

UNUSUAL FOOD-PLANTS OF SATURNIA PAVONIA-MINOR.—With reference to Mr. Parfitt's article (*Entom.*, **80**: 116) on the food-plants of the Emperor Moth, I might mention that in 1944 I came across a young brood of *S. pavonia-minor* feeding on dog-rose. The larvae were about ¼ in. long, and the empty eggs were on a twig of the same bush. The larvae all had light green tubercles and not pink, as one usually finds on heather feeders.—B. R. Stallwood; 19, Southfield Gardens, Strawberry Hill, Middlesex.

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It is no wonder that this prosperous Society, which can draw on the resources of 387 members, has produced an exceedingly good issue of its *Transactions*. Outstanding articles in this appear under the following headings: "An Introduction to the Study of Collembola," by Philip M. Miles, F.R.E.S.; "Sex Attractant Principles of Moths," by Dr. Harold King, F.R.S.; "Some Preliminary Observations on *Pieris rapi* (L.)," by J. Anthony Thompson, M.A., F.R.E.S., including the naming of five new aberrations; "*Angerona prunaria* (L.), its Variations and Genetics," by Harold B. Williams, LL.D., F.R.E.S., naming 12 new aberrations with two beautiful coloured and one monotone photographs; "*Caloptilia* Hubner, a Genus of Tineina," by S. C. S. Brown, with an excellent coloured plate; "Lepidoptera of Folkestone," by A. M. Morley, O.B.E., M.A., F.R.E.S. Apart from giving in full the other papers also read before the Society in the previous year, there is a short account of "The Bright Bequest," by Castle Russell, giving details of some of the better known aberrations of "the British blues" that are in this collection, which was left to the Society in 1941. There is also a full report on the exhibits at the Annual Exhibition held at Burlington House on October 26, 1946. The numerous Field Meetings are recorded in detail. The 16 plates in monotone are of high standard, with one exception (Plate XV). Plate IV depicts *Ourapteryx sambucaria* ab. *deflexaria* Schultz.

The cost of producing this very successful number of these *Transactions* with its Plates, coloured and otherwise, must be very considerable nowadays, and it is to be noted that the Royal Society thought fit to give £125 towards its publication—a gift which they can have little regret in having given now they see the quality and importance of the material published. H. B. D. K.

Natural History Series. 8vo. 103 pp. 17 Plates. Chester Society of Natural Science, Literature and Art. Price 7*s.* 6*d.*

This number, dedicated to the late Professor Robert Newstead, F.R.S., whose work on Scale Insects and Tsetse Flies is so well known, is of a high standard on a wide variety of subjects of interest to naturalists. The entomological section contains some original observations, such as the assembling of between 100 and 150 specimens of *Zygaena filipendulae* to females of *Lasiocampa quercus* (p. 68). There is a plate (p. 70) of "New Varieties of British Lepidoptera from Cheshire and Denbighshire," by S. Gordon Smith, F.L.S., F.R.E.S. This contains the following insects, together with new names proposed for them. I feel that many of these are synonyms: *Lasiocampa quercus* race *callunae* form *semi-obsoleta* is a synonym of *semi-fasciata* Wagner (1919, *Int. Ent. Z.*, **13**: 159); *Achlya flavicornis* form *unilinea* is a synonym of ab. *haverkampfi* Lambillion (1904, *Ann. Soc. Ent. Belge*, **48**: 187); *Achlya flavicornis* Linn. form *nigro-plumbosa* does not seem to have been named before; *Achlya flavicornis* form *signatipennis* is a synonym of ab. *clausa* Lempke; *Selenia bilunaria* form *estynensis* is probably a synonym of ab. *bilineata* Grosse; *Selenia bilunaria* form *nigrofasciata* is a beautiful new aberration which occurred, with others, in the twelfth generation of inbred stock; *Earophila badiata* form *eckfordii* again is new. This book is full of interest for anyone, scientist or otherwise, who is interested in Natural History, and is worthy of having a wide distribution. More careful reading of proofs would have avoided numerous errors in the text (e.g. "*Glossina palpis*" for *palpalis*, etc.). H. B. D. K.

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A COLIAS NEW TO BRITAIN (LEP. PIERIDAE).

By Lucien A. Berger.

In 1945 I twice reported the fact (*Lambillionea*, **44** : 9, 11, and *Bull. Ann. Soc. Ent. Belg.*, **81** : 33) that under the name of *Colias hyale* L. two distinct species are confused. A full account of the subject, by Dr. M. Fontaine and myself, has been submitted to *Lambillionea* and will shortly be in the press. The purpose of the present note is to record the presence of this second, twin species in Britain and to discuss the question of its correct name.

1. *The New Species.*

This new *Colias* may be briefly characterized as follows: Apex and termen of fore wing rounded; black markings of both wings less extensive than in true *C. hyale*, especially the apical and submarginal markings. Discoidal of fore wing large, of hind wing equally so and always deep orange. Ground-colour canary yellow in the male, pure or even bluish-white in the female (occasionally yellow).

The insect is much faster and wilder on the wing than *C. hyale*, and is attached to stony calcareous areas where *Hippocrepis comosa* grows; this is its only food-plant. Larva very different from that of *C. hyale;* green, streaked with yellow and spotted with prominent black dots. Spring and summer generations equally abundant (in *C. hyale* the first generation is always much the rarer).

The specimens figured by Verity (*Rhop. Pal.*, pl. 40, figs. 31, 36) and subsequently described by him (1916, *Ent. Rec.*, **28** : 99) as *Colias hyale* race *calida* Verity represent this newly recognized species, as do the figures of "*Colias hyale*" in South's *British Butterflies*, pl. 21. On the other hand, figures 3–5 on plate 25 of Ford's *Butterflies* represent true *hyale.*

2. *Its Occurrence in Britain.*

In May, 1947, I was able to examine several large British collections, and was agreeably surprised to find in them several examples of this new species, as follows:

British Museum (Natural History). At South Kensington: 1 ♂, Folkestone, 1875 (Sidney Webb); 1 ♂, Folkestone, v, 1893

(S. G. Hills); 1 ♂, Folkestone, viii, 1900 (Hills); 2 ♂, Salisbury, ix, 1900; 1 ♂, Salisbury, x, 1900 (B. W. Neave Coll.); 1 ♂, no locality (G. A. Clark); 1 ♀, no locality (E. L. Arnold). At Tring: Several specimens without data in the British Collection.

Oxford University Museum: 1 ♂, 1 ♀, 9.viii.1892, Berkshire, near Reading, and 1 ♂, 13.viii.1892, Sulham (W. Holland); 2 ♂, Isle of Wight (Meldola Coll.).

The food-plant being abundant in England on the chalk downs in the south, the *Colias* should be sought there, not only in summer and autumn, but also in the spring, for it is not impossible that the species is indigenous.

3. *Its Name.*

The name *Colias hyale* L. must be retained for the commoner British species, that is to say for the one in which the fore-wing apex is acute, the termen more or less straight, the black markings well developed, and the ground-colour in the male greenish-yellow, the discoidal spot on the hind wing small, yellow or pale orange, the ground-colour in the female greenish-white or yellowish, and the disc of the hind wing very dusky.

This form agrees perfectly with the first specimen in the Linnean Collection at Burlington House, which in turn corresponds exactly with the description given by Linnaeus in 1761 (*Fauna Suecica*: 272). Linnaeus' description in 1758 (*Syst. Nat.*, ed. x: 469) is too laconic to be intelligible, and besides, the first two references there given apply, as is well known, to *C. croceus* Fourcroy.

In my notes of 1945 I called the new species *Colias alfacariensis* Ribbe (1905, *Soc. Ent.*, **20**: 137), which is older than *calida* (1916) and *australis* (1911) of Verity. I had some doubts as to the use of this name. The war had not come to an end and certain information was lacking; Belgium had been practically isolated for a period.

The form *alfacariensis* was considered by Ribbe as a simple aberration; the description is not very clear, and it is difficult to know exactly what the author meant; in any case it was a form that could be found everywhere. However, as it was described from a locality situated in a region where only the new species flew, it is pretty certain that ab. *alfacariensis* belonged to that species.

Amongst the numerous names given to forms of "*hyale*" there are certainly others older than these. The descriptions of these seldom suffice for a decision as to the species to which they refer; only the examination of the types, or sometimes the localities, can help us, but the types are often lost or inaccessible.

A survey of possible names has produced the following results :

Hayale Lewin, 1795; *heliceides* Selys, 1844; *kirbyi* Lewis, 1872; *nigrofasciata* Groum-Grshimailo, 1884; *uhli* Kovats, 1899; and *radiiformis* Schultz, 1904, all apply to *Colias hyale*.

The name *sareptensis* Staudinger, 1871, denotes neither a hybrid between *C. erate* Esper and *C. hyale* L., nor a race of *hyale* as Verity thought, but the male form of *C. erate* Esper that has spots in the marginal border. The genitalia prove this. As to the application of the following names, all published as aberrational or varietal names, I can form no definite opinion : *atava* Reuti, 1853; *flava* Husz, 1881; *pallida* Robson, 1886; *pallida* Cockerell, 1889; all Tutt's forms of 1896, i.e. *apicata*, *intermedia*, *obsoleta*, *pallida* and *unimaculata*; *viridescens* Sloper, 1903; *junior* Geest, 1905; *simplex* Neuburger, 1905.

In the British Museum (Natural History) there is a female *Colias* bearing simply the labels: "Elwes Coll.," "Taganrog," "Paratype," but standing above the name labels "*inversa* Alph." and "*meridionalis* Krul.," both described from Taganrog. This specimen without doubt belongs to our new species. Alpheraky (1908, *Hor. Soc. Ent. Ross.*, **38** : 565), after discussing *meridionalis* Krul. and the forms *flava*, *inversa* and *nigrofasciata*, wrote: "Besides these forms one meets examples of the ordinary pale type (*hyale* type) with more rounded wings than . . . as if these were a special *Colias*."

There is no doubt that this "special *Colias*" is our new species. According to Alpheraky's text neither *inversa* nor *meridionalis* can apply to our new species. Therefore, if the "paratype" in the British Museum is a paratype of either of these names, the type must belong to a different species. It is not impossible, however, that Alpheraky himself may have confused the yellow females of the two species (which are notably more difficult to distinguish than the males), in which case there is also the possibility that the type of *inversa* also belongs to the new species. This can only be settled by an examination of the type, if it still exists in the Zoological Museum in Leningrad.

In view of all this, the new *Colias* must remain provisionally named *Colias alfacariensis* Ribbe.

Finally I take the opportunity of thanking especially Mr. N. D. Riley and the late Dr. A. S. Corbet of the British Museum, and Dr. B. M. Hobby of the University Museum, Oxford, for the facilities they kindly placed at my disposal during my visit to those institutions.

Royal Belgian Museum of Natural History,
Brussels.

EUBLEMMA OSTRINA, *E. PARVA* AND OTHER LEPIDOPTERA IN IRELAND IN 1947.

By Brian P. Beirne.

Up to the end of July in 1947 Lepidoptera in Ireland were three weeks to a month late in appearing. For instance *Maniola jurtina* did not appear until July 5, and was not out in any numbers until August. The main feature of the season was the remarkable number of immigrants. The following are some notes on the species of Macrolepidoptera taken during the summer, and include records for two Noctuids new to the Irish list.

Immigrants.—*Laphygma exigua*: A total of eleven specimens were taken in a light-trap at Seapoint, Co. Dublin. There are only two previous Irish records of this species. The dates of capture were as follows: June 12 (three specimens), June 13 and 18, August 9, 11, 21, 23 and 28, and September 20. The earlier specimens were very worn, but the late August and the September specimens were strongly marked and in perfect condition, suggesting that they may have bred here.

Eublemma ostrina.—A female in perfect condition was found resting on the outside of the Seapoint light-trap on the morning of June 10. It is the ab. *carthami*, but is not so yellow as the figure given in South (*Moths of the British Isles*, 2, pl. 21). This rare immigrant has not been recorded from Ireland previously.

Eublemma parva.—This species also is new to the Irish list. A female in first-class condition was taken at Newcastle, Co. Wicklow, on August 18. It was disturbed from the grass bordering the seashore about half a mile south of Newcastle railway station at about 7 o'clock in the evening (summer-time).

Nycterosea obstipata.—A total of 32 specimens were taken. The latest was on the coast about a mile south of Greystones, Co. Wicklow, on October 15. The remainder were found in the Seapoint light-trap on the following dates: June 1, 3, 4, 5, 20 and 23, July 27 and 30, August 9, 10, 11, 12, 13, 17 (two), 19 (two), 20 (three), 21, 22, 25 and 28, and September 3, 18, 20 (two), 25, 27 and 29. Except for specimens taken on June 5 and August 7 and 22, all were males. A further female was in the trap on May 28, but escaped. The specimens taken in the second half of August were mostly in first-class condition, indicating that they may have bred locally; the remainder were mostly more or less worn.

Colias croceus was first seen on July 31 at Sutton, Co. Dublin, and was frequent in Dublin and Wicklow during August and September, the last specimen being seen on October 28, at Finglas, Co. Dublin. The species was particularly common on the coast, and on August 16 practically all the specimens seen at Newcastle, Co. Wicklow, were flying northwards along the railway. On other dates no particular direction of flight was noted. A male *Lithosia quadra* and several *Peridroma porphyrea* (*saucia*) came to the Seapoint light-trap. *Plusia gamma* came to the trap from July onwards, but usually only one or two specimens a night. *Vanessa atalanta* and *V. cardui* were frequent in Dublin and Wicklow in August and September.

LIGHT-TRAP CAPTURES.—A light-trap was in operation all night every night at Seapoint, Co. Dublin, from May 6 to September 30, except from June 29 to July 24. The trap was in a similar position and facing the same way as the trap operated before the war (see Beirne, *Ent. Rec.*, **53** : 45), except that instead of being about six feet from the ground, it was in a top window of the house more than 50 ft. up. A much smaller number of species was taken in this trap, the absentees chiefly being Microlepidoptera. However, thirteen species were captured which had not been taken in the lower trap in the four years before the war. These were : *Laphygma exigua, Atethmia centrago* (*xerampelina*), *Cucullia chamomillae, Eublemma ostrina, Pseudoterpna pruinata, Trichopteryx carpinata, Eupithecia venosata, E. nanata, Thera obeliscata, Euphyia picata, Nycterosea obstipata, Ellopia fasciaria* (*prosapiaria*) and *Plagodis dolabraria*, bringing the total number of species taken in light-traps at Seapoint to 323. Of the additions, *E. picata* is a rare species in Ireland, there being only four previous records, none of which is from Co. Dublin. *L. carpinata* apparently is a new county record. *A. centrago* and *P. dolabraria* have each been recorded once before from Co. Dublin.

The appearance of the conifer-feeding *T. obeliscata* and *E. fasciaria* could be explained by the growth of some assorted conifers nearby. These trees were planted shortly before the war. The appearance of *P. pruinata* and *E. nanata* is less easy to explain, unless they came from Howth, about six miles directly across Dublin Bay from Seapoint.

Up to June 13 starlings, which nested in the roof above, entered the trap early on most mornings and ate many specimens. Species of which remains were found included *C. chamomillae, L. exigua, Apamea monoglypha, Mamestra brassicae, Agrotis exclamationis, Meristis trigrammica, Triphaena pronuba, Amphipyra tragopogonis, Selenia bilunaria, Gonodontis bidentata* and *Biston betularia*. The last was particularly unfortunate in that one of the specimens destroyed was ab. *doubledayaria*, of which there are only five previous Irish records. Species which were common in the trap and which were not attacked included *Spilosoma lubricipeda*, *S. lutea* and *Callimorpha jacobaeae*. An arrangement of wires kept out the birds for the remainder of the summer except on one occasion in September, when they broke through. *Peridroma saucia*, *Agrotis segetum* and *Amathes c-nigrum* were eaten, but *Eumichtis lichenea*, which again was the most abundant noctuid in the trap, was not. One specimen of *E. lichenea* was attacked but not eaten. The moths eaten by the starlings apparently were all attacked from the front, as many specimens were found in which the head and thorax had been eaten while the abdomen remained, while there were none in which the abdomen only had been eaten. In most instances the whole body was eaten, the birds taking the moths outside the trap for the purpose.

LEPIDOPTERA IN THE BURREN.—The Burren is a remarkable district covering most of the northern half of Co. Clare. It consists typically of bare limestone pavement traversed by cracks every foot or so. An extraordinary variety of plants grow on the rich soil of these fissures, including both alpine and Mediterranean species. On sheltered hillsides there are large areas of scrub, mainly hazel. A number of species of Lepidoptera are known to occur in Ireland only in the Burren.

Between June 30 and July 8 I visited this region with Mr. F. O'Rourke, staying at Corofin near the southern margin of the Burren. On June 28 *Leptidea sinapis* and *Nudaria mundana* were frequent in the woods bordering the lake at Corofin. On the following day we collected at Sheshodonnell, a district about three miles south of the village of Carran. The weather was dull, with a high wind, and it was possible to collect only in the shelter of the stone walls. *Zygaena purpuralis* was very abundant, there often being several specimens on each flower-head. It outnumbered *Z. filipendulae*, which was present in average numbers, by about 30 to 1. *Odezia atrata* was the second most common species, being particularly abundant in the glades of the hazel scrub. *Parasemia plantaginis* and *Phothedes captiuncula* were flying commonly. The latter species is very active and not easy to capture. *Polyommatus icarus* was more common than I have seen it anywhere in Ireland. In the females the upper surfaces of the wings were almost entirely blue, the blue sometimes extending to outside the orange marginal spots. Other species taken were *Coenonympha pamphilus*, *Lycaena phlaeas*, *Leptidea sinapis*, *Lasiocampa quercus*, *Setina irrorella*, *Nudaria mundana*, *Ectypa glyphica*, *Plusia pulchrina*, *Chiasmia* *clathrata*, *Epirrhoë tristata*, *Hepialus humuli* and *H. fusconebulosa*. A very large specimen of the last species was attacked by a carabid beetle which had gripped the end of its abdomen, with loud buzzing from the moth. Single specimens of *Erynnis tages* and *Argynnis euphrosyne* were seen but not captured.

From July 2 onwards there was a strong wind and almost continuous rain. The nights were cold and windy. Light was tried at Corofin, but no interesting species were taken. The only species noted during this period were *Z. purpuralis* and *O. atrata*, which were found commonly everywhere from south of Corofin to Ballyvaughan and from Lisdoonvarna to near Gort. It was obvious that the former was the dominant Burren species at the time; it was everywhere, and in good condition.

On July 7 the rain was only intermittent but there was a high wind. In a valley about 20 ft. wide and deep at Ballymihil, about halfway between Corofin and Ballyvaughan, the same species were found as at Sheshodonnell, except for *L. sinapis*, *E. tages*, *A. euphrosyne* and *E. glyphica*.

LEPIDOPTERA IN S.-W. IRELAND.—Between July 8 and 24 I stayed with Mr. P. P. Graves at Ballylickey, near Bantry. The weather was not good for collecting during most of that time. *Plusia festucae*, *P. bractea*, *Rivula sericealis*, *Schrankia turfosalis*, *Hemithea aestivaria* (*strigata*), *Gymnoscelis pumilata*, *Perizoma albulata* and *P. alchemillata* were amongst the species taken at Ballylickey. At Glengarriff the Lepidoptera had suffered from the intensive grazing of the herbage in the woods during the winter. *Coenonympha tullia*, *Jaspidia pygarga* (*fasciana*), *Eustrotia olivana* and *Plusia festucae* occurred in a heathy area near (north of) Glengarriff. *Dysstroma concinnata* was taken at the Kerry side of the tunnel on the Kenmare-Glengarriff road on July 13 and 14. It rests on the rocks with the common *Entephria caesiata*. The rocks less than about 30 ft. above the road are the best; higher up no *concinnata* and few *caesiata* were seen. In wet weather they rest on the dry undersides of overhanging rocks. Neither species could be found at Coomhola on July 11. On the heaths near Lough More, south of Glengarriff, *Coenonympha tullia*, *Anarta myrtilli*, *Diacrisia sannio*, *Pseudoterpna pruinata*, *Ortholitha mucronata*, *Xanthorhoë montanata* and other heath species occurred. These were also found at the *concinnata* locality. *Jaspidia pygarga* and *Eustrotia olivana* were common at Derrycunihy, Killarney, on July 16, where a further specimen of the dragonfly *Somatochlora arctica* was taken. *Coenonympha tullia* and *Ortholitha mucronata* were common on the heaths around Lough Looscaunagh, Killarney, on the same date. *O. scotica* was not seen at Killarney or Glengarriff. *Venusia cambrica* was taken at Tragh Wood, Lough Inchiquin, Co. Kerry, on July 21.

The only other species of Macrolepidoptera worth noting was *Comacla senex*, which was taken at Kilmacanogue Marsh, Co. Wicklow. There are only three previous Irish records.

THE SUSPENSION OF THE PUPA IN THE GENUS TROIDES HÜBNER.—In the description of the genus *Troides* in the *Fauna of British India*, Butterflies, 1 (2nd edition) the following paragraph appears: "The pupa, unlike that of other groups of the family, is sustained by separate lateral threads attached by a tubercle on each side, and not by a loop round the middle." I have no first hand experience of the pupa of any *Troides* species, but it seems to me quite impossible for the larva to suspend itself in such a way as to produce the abovementioned method of pupal suspension. The larva cannot possibly attach the lateral threads to its own larval tubercles; at the time of moulting they would either break loose or be shed along with the larval skin—in either case a disaster.

In a paper by Chapman (1905, *Trans. Ent. Soc. Lond.*, p. 215) there is a detailed description of the pupa of *Papilio machaon*, and the silken girdle is recorded as passing under a lappet on the fore and hind wing, just below the cell some little way basal to vein 2, which forms a sort of tunnel. It is further stated that in a pupa produced by a larva whose girdle had been removed, the tunnel itself was not formed but its position was indicated by a glazed line, so that it appears that it is the weight of the pupa that imbeds the silk thread in the cuticle. I have recently examined dried pupae of seven Indian Papilionids—*Polydorus hector* L. and *aristolochiae* F., *Chilasa clytia* L., *Papilio helenus* L., *polytes* L. and *demoleus* L., and *Graphium doson* Felder—and found the same arrangement as described for *machaon*; in fact in most cases I found it impossible to withdraw the thread, which was firmly fixed in the tunnel.

I suggest that the *Troides* larva spins a complete girdle in the same way as other members of the family, but that, at the time of transformation, the weight of the large and heavy pupa imbeds the girdle in the unhardened chitin across the dorsum between the two lateral tubercles, instead of only in the "tunnel" at the base of the wings as in other Papilionids.—D. G. SEVASTOPULO, F.R.E.S.; 147, Gloucester Terrace, W. 2.

APOCHEIMA HISPIDARIA AT CHEAM, SURREY.—I took a specimen of *Apocheima hispidaria* at light here on February 29. This, following on Mr. E. H. Wild's taking this insect at Selsdon, Surrey, earlier in the month, rather suggests the species is getting a little more widespread.—H. A. MORRELL; 63, Salisbury Avenue, Cheam, Surrey.

BRITISH LEPIDOPTERA COLLECTING, 1947.

By C. G. M. de Worms, M.A., Ph.D., F.R.I.C., F.R.E.S.

(Continued from p. 122.)

At Aviemore in very changeable weather, in the birch wood and on the adjoining heaths, on June 28, *Ortholitha mucronata* was appearing with a few worn *O. scotica*. *Brenthis selene* was well out, and among day-flying geometers *Scopula ternata* (*fumata*), *Xanthorhoë montanata*, a late *Scodiona fagaria* (*belgaria*) were noted. *Polia tincta*, just emerged, were on the fences, and the only *Parasemia plantaginis* I saw and took was f. *hospita*. During the afternoon of the 28th on the moorlands above Aviemore, on a bank covered with rock rose several very fresh *Aricia agestis* f. *artaxerxes* were captured, but there was very little on the higher ground except *Larentia caesiata*. That night at sugar, which it was only possible to start looking round at 12.30 a.m., the chief visitors were *Tethea duplaris*, *Hippa rectilinea*, *Ceramica pisi*, *Eumichtis adusta* and *Diarsia festiva* (*primulae*). Fresh insects were still coming to the patches at 2 a.m. Beating junipers in the Rothiemurchus area early on June 29 provided a few large larvae of *Thera cognata* and many small *T. juniperata*. The fine grey form of *Cleora repandata* flitted off tree trunks and fence posts. Later that day on the summit of Carn-dagh-mohr Mr. Bretherton and I had quite a thrill in finding *Psodos coracina* just out, but this was nothing to what awaited us the next afternoon when we made an all-day outing to the Cairngorm region (*vide Entom.*, **80** : 195). Ascending to a level of just under 2700 ft., we found the plateau a dancing mass of thousands of this little black geometer, the females almost predominating as they ran like flies over the granite pebbles. We obtained a fine series with many striking and variable forms. Pupae of this species were also quite numerous underneath the lichen. En route we had taken the first *Coenonympha tullia*, and there were still plenty of *Ortholitha scotica* on the high ground. We were, however, horrified to see how much of the famous fir forest had been devastated, which must have deprived these glorious surroundings of many insects and nesting sites for rare birds. After dark the only new arrivals to the sugar patches were *Apatele leporina*, *A. psi*, *Hadena contigua* and *H. thalassina*, also the bright northern form of *Tethea or*.

A very wet morning greeted us to usher in July, but conditions improved when we set out after lunch for Loch-an-Eilan. Apart from a few *artaxerxes* and *C. tullia* geometers were the chief quarry, among which were some fine *Dysstroma truncata* and *Cleora repandata*. Some of the meadows were full of *Odezia atrata*. July 2, another rather moist day, saw us on the large stretch of heathland bordering the railway to the north. Here we concentrated on beating and managed to obtain broods of *Endromis versicolora* larvae, some almost full-fed. Several *Polia tincta* were to be found on posts, and female *Pheosia gnoma* (*dictaeoides*) on birch trunks. The next two days were not very profitable. Among the butterflies *artaxerxes* was emerging in good numbers, and there were some very bright *Cleora repandata* on fences when I visited Struan on the 4th, but rainy conditions prevented much else of interest being observed. On the last two nights nothing new appeared on the sugar near Granish. On each occasion there had been a sprinkling of fairly common species. The week on the whole had been rather disappointing for numbers of Lepidoptera except for *Psodos coracina*.

On the morning of July 5 I left Aviemore and reached Grange-over-Sands in the evening. I had not been to this district since 1939, and was very glad to have the opportunity to revisit old haunts. The next morning, with Dr. Lowther, in very dull weather, I made a trip to some of the well-known mosses, but was somewhat shocked to find how overgrown most of the ground had become, and that bracken was choking out the heather in parts which had been burnt. Very little was on the wing, and it was not till the late evening that we drove to Lakeside on Windermere. Here we had quite a harvest at sugar, on which we took some fine *Polia nebulosa*, *Diarsia festiva* and *Ceramica pisi*. Among many common geometers at dusk we saw *Perizoma alchemillata* as well as several of the Snouts, including *Zanclognatha tarsipennalis* and *Hypena proboscidalis*. After a very stormy morning on July 7 we made our way to one of the moorlands above the town, where on a rocky slope we put up a few *Phothedes captiuncula* during intermittent sunshine. Apparently this little moth had been very abundant in this spot a week earlier. After dark the porch lamp at Dr. Lowther's house attracted a few *Amathes ditrapezium*. At sugar further *Polia nebulosa*, *Apamea hepatica* and dark *A. monoglypha* were taken.

On the 8th I returned to Formby. Beating birches that evening on the sandhills yielded small *Apatele leporina* and *Notodonta dromedarius*, but butterflies were generally scarce, as also were insects at light during the two nights of my visit. The next day in glorious weather the Sychnant Pass near Conway was visited. *Pararge aegeria* was the commonest butterfly; among the moths *Cleora repandata*, *Nudaria mundana*, *Hepialus velleda* and *H. hectus* were taken. It was disappointing not to find any *Sterrha eburnata* (*contiguaria*), which had been taken shortly before.

I was back in Surrey again on July 10, but in spite of an extremely warm spell during the middle of the month with the thermometer at over 80° in the shade very little came to light or sugar near Horsell. *Parastichtis suspecta* was one of the most plentiful noctuids at the patches. It was a very hot day when I joined Commander Harper and his family on July 13 in Sussex. This was the first time during the summer that I had seen butterflies really abundant, especially *Aphantopus hyperantus* and *Argynnis paphia*. In the afternoon we watched a number of *Apatura iris* circling high up round the oaks and occasionally make a tantalizing swoop, always just eluding our nets. Two males remained quite a long time gorging on an oozing oak branch well out of reach. *Limenitis camilla* on the other hand was scarce.

A week later on July 20 I was again in Sussex on the downs for the day, but *Lysandra coridon* was well below its normal numbers whereas *Argynnis aglaia* was swarming, and I have never seen *Eremobia ochroleuca* so common on the knapweed heads and flying fast along the grassy slopes. On the way back I shelled out several pupae and larvae of *Nonagria sparganii* from the lesser reed mace.

The heat wave continued without a break during the latter part of the month. It was still extremely hot when on July 25 I joined Commander Harper in the Portsmouth district, where we found *Bryophila muralis* just emerging. Arriving in the New Forest in the early evening we worked one of the stretches of heath on Setley plain. *Eumenis semele* and *Plebejus argus* were everywhere and we came across plenty of geometers, including very fresh *Selidosema plumaria* (*ericetaria*), *Ortholitha mucronata* (*plumbaria*) and *Pseudoterpna pruinata*. Sugar was very disappointing, the chief visitors being *Lampra fimbriata* and *Amphipyra pyramidea*, but we saw no sign of the "Crimsons," which were our main objective. At the lamps in Pondhead there was quite a rush of *Lymantria monacha* and *Cosmotriche potatoria*, together with a few *Cleora jubata*. Little else came, though we stayed till nearly 2 a.m.

The next morning at 85° in the shade I took a walk in Parkhill enclosure, but possibly it was too hot even for the butterflies, as I have never seen so few *Argynnis paphia*—only two f. *valesina* in two hours in spite of continuous sunshine. *Maniola tithonus* and *Aphantopus hyperantus* were more numerous. I took a heavily spotted male and female of the former. Mr. Geoffrey Cole arrived in the afternoon and we drove to Salisbury, halting *en route* in a wooded locality where we spotted a single male *A. iris* swoop past us, but here again insects appeared scarce, as also were larvae on the oaks and young poplars. It was very sultry that night when we visited the local cornfields, but though many common species of Noctuid were careering about at dusk, especially *Apamea secalis* and *Leucania pallens*, we did not see a single *Oria musculosa*, which eventually turned out to be quite rare. It was even hotter on the 27th.

We revisited the local woods, but saw little of interest except many *Colias croceus*. *Lysandra coridon* and *Eumenis semele* were much more plentiful on the Downs that evening.

Almost tropical weather greeted me when I reached Folkestone on August 2 for a stay of ten days. That evening I went with Mr. Morley to the Ham Street woods. At dusk there were quite a lot of geometers, in particular *Cosymbia porata* and *C. punctaria*. We got quite a thrill on the first round of the sugar to see a *Catocala sponsa*, which unfortunately eluded us as we attempted to box it. *Amphipyra pyramidea* and *Cosmia trapezina* were the other main visitors. Larvae of *Cucullia asteris* were as usual very abundant. For the next few days over the week-end the heat was so intense as to make collecting hardly profitable till fairly late in the day. Several visits were paid to the local downs, where *Lysandra coridon* was in good numbers, with plenty of *Eumenis semele*, *Maniola jurtina* and some late *Melanargia galatea*. *Bryophila perla* was fairly common, and I was lucky enough to find an extremely dark example. The great season for *Colias croceus* was just starting. On the 8th I took the first f. *helice* together with a female *C. hyale* near Folkestone. *Vanessa cardui* was also well to the fore. The next morning I went over to Herne Bay to join Mr. Dudley Marsh, and we spent the rest of the day touring the local clover and lucerne fields in Thanet. In almost every one we found *C. hyale*, mostly fresh males, while *C. croceus* was comparatively scarce. I saw even more *C. hyale* on August 10 on a further visit to Thanet with Dr. Atholl Riddell. We carried out no set night activities during the week until the 11th, when I went to Dungeness with Messrs. Morley, Youden and Fairclough. The night was very sultry. Except for one *Leucania albipuncta* sugar was very unproductive. About 11 p.m. we had quite a run of *Lasiocampa trifolii*, mainly females. The males had been careering about over the shingle at dusk. Mr. Fairclough had taken a good series of *Nonagria sparganii* at rest and in flight shortly after dark. This expedition concluded quite a profitable sojourn in this well-known collecting district.

I returned to Surrey on August 12. It was so hot and dry during the middle of the month that insects were almost reluctant to fly even at night. On the 16th Mr. Dudley Palmer and I made an afternoon trip to Thanet in blazing sunshine at 90° in the shade. Again *Colias hyale* was to be found in every lucerne field. On this occasion *Aglais urticae* was swarming, and I have never seen it so plentiful as on the north downs near Ranmore Common, which we visited with Mr. John Howell the next afternoon. *Colias croceus* appeared almost everywhere we stopped in this area. Among geometers *Scopula ornata* was much in evidence on the chalk.

(To be continued.)

BUTTERFLY MIGRATIONS NOTED IN THE ISLES OF SCILLY IN 1947.

By W. H. Dowdeswell and E. B. Ford.

During a stay of about three weeks in the Isles of Scilly in 1947 we received numerous reports of the migration of butterflies from one island to another. A few observations made by ourselves are summarized in the following table :

Date (August)	Time (G.M T.).	Species.	Observed.	Direction of flight	Direction of wind
27th	9.00	*M. jurtina*	St. Martins and Tean, midway	N.W.	N.W
27th	14.30	*V. atalanta*	Tean and Tresco, midway	W.	S.E.
27th	14.45	*C. croceus*	200 yds. from Tean, towards Tresco	W.	S.E.
27th	16.30	*A. urticae*	St. Martins and Tean, midway	S.E.	N.W.
30th	12.45	,,	20 yds. from Tean, towards St. Martins	S.E.	S.E.
30th	13.15	*P. rapae*, two	Near Tean, flying to St. Martins	S.E.	S.E.

We have omitted from this list an additional occurrence of some interest which took place about 7 p.m., G.M.T., on August 30. We had been out mackerel fishing accompanied by Mr. Bernard Bond, of Lower Town, St. Martins, and were about to drop anchor between the islands of Tean and St. Martins when a *Pieris rapae* flew weakly across the boat and alighted on the water, which was dead calm, with its wings outspread. About two minutes later it made one or two convulsive movements, and to our surprise succeeded in rising. It flew about ten yards and settled again, once more with wings outspread, only to repeat the performance a minute or two afterwards. The evening was already cool and dusk was falling and, as the insect appeared unable to rise again, we rescued it with a boat-hook. We are of opinion that in the warmth of mid-day and in the very calm conditions in which we observed it, this butterfly would have been able to continue its journey after resting on the sea.

A Further Record of Eulia formosana.—I should like to record the capture by myself of *Eulia formosana* at light near Canterbury on the night of July 24, 1946.—J. M. Chalmers-Hunt; 70, Chestnut Avenue, West Wickham, Kent.

NOTES ON SOME GALL-CAUSING CECIDOMYIDAE: V.

By M. Niblett, F.R.E.S.

Dasyneura acrophila Winn.—The white larvae of this species inhabit podlike galls upon leaves of *Fraxinus excelsior* L.; these they leave to pupate in the earth. The galls are usually empty before the end of June. I have had the midges emerge freely early in May of the following year.

Dasyneura françoisi Kieff.—So far as my experience goes this gall is very uncommon; I have found it once only, at Walton Heath in August. It takes the form of a small egg- or spindle-shaped swelling on the mid-rib of leaves of *Achillea millefolium* L. I failed to rear the midges from the few galls found.

Dasyneura galeobdolontis Winn.—Galls of this species were found in some numbers on stems of *Lamium galeobdolon* Crantz at Selsdon Wood on 6.x.45. Many galls were at the base, but quite a number were found higher up the stems. The larvae are white and pupate in the galls; from these a few midges emerged in mid-May of the following year.

Dasyneura glechomae Kieff.—The gall is in the form of a small pouch formed by the terminal leaves, on stems of *Nepeta hederacea* Trev.; the larvae are white and pupate in the earth. From galls found at Walton Heath 9.vii.46 I had midges emerge between 11.vii and 25.vii.46. In 1947 galls were found in late July; from these the midges did not emerge until the beginning of September. This species is also said to cause the flowers to become swollen. A few swollen flowers were found in June at Banstead Wood, but the larvae had left them.

Jaapiella floriperda F. Lw.—Flowers of *Silene inflata* Sm. were found in July at White Downs with numerous pale red larvae of this species in them. These pupated in earth, and the midges emerged between 8.viii and 5.x of the same year.

Macrolabis pilosellae Binnie.—For several years I have managed to find a few galls of this species on leaves of *Hieracium vulgare* Tausch in July and August. The larvae pupate in the galls, the midges emerging in the last week of August. The larvae suffer considerably from the attacks of Chalcids.

Macrolabis stellariae Liebel.—On 23.viii.47 at Burford Bridge I found several plants of *Stellaria aquatica* Scop. rather heavily galled by this species. Numerous yellowish larvae were present; these left the galls immediately to pupate in earth. Numerous midges emerged during the first week of September.

Craneobia corni Gir.—I have experienced considerable difficulty in rearing this species. On 27.ix.45 I collected a number of the galls on leaves of *Cornus sanguinea* L. at Boxhill. The galls were left in a tin box for some days, during which time several of the orange-red larvae left them: these were placed on damp sand, but appeared to be in no hurry to enter it, although they did eventually. The galls were then placed on damp sand and a few more larvae were seen to leave. Between 24.iv and 2.v.46 a number of the midges emerged; the larvae of this species are heavily parasitized by Chalcids, these emerging at the same time as the midges.

Wachtliella stachydis Bremi.—In a previous paper in this series (1) I stated that all the midges of this species I had bred emerged in May of the second year. In June and July, 1947, I collected a number of galls at Epsom Common and Worms Heath: both series yielded numerous midges, these emerging between 12.vii and 4.viii.47. Here we have either more than one brood or the possibility of a delayed emergence.

Rondaniella bursaria Bremi.—The cylindrical pubescent gall of this species, which has the curious habit of falling from the leaf, leaving a circular hole in the lamina, may be found on *Nepeta hederacea* during the summer and autumn. Each gall contains a single white larva, which pupates there. All the midges I had bred emerged in September of the first year. A number of galls were collected at Worms Heath 11.x.45; as they fell from the leaves they were placed on damp sand. Between 23.v and 16.vi.46 34 midges emerged. I am inclined to think that there are at least two broods a year.

Rhopalomyia tanaceticola Karsch.—The pale-red larvae of this species pupate in the egg-shaped galls occurring on the stems of *Tanacetum vulgare* L. Galls collected at Burford Bridge 9.vii.47 yielded several midges between 25.vii and 2.viii.47; numerous Chalcids also emerged during the same period.

Contarinia pilosellae Kieff.—The leaping yellow larvae of this species are to be found in the swollen flower-heads of *Hieracium vulgare*, which they leave to pupate in the earth. There appears to be more than one brood in a year. I have found the larvae in early June and again in August, but have not yet bred the midge. A statement that the larvae are creamy in colour and non-leaping must, I think, refer to some other species.

Contarinia schlechtendaliana Rübs.—I have found the yellow leaping larvae of this species in flower-heads of *Sonchus oleraceus* L., *S. arvensis* L. and *S. asper* Hill always some time in July. The larvae leave the flowers to pupate in the earth, the midges emerging in August. From one series I took at Effingham Common on *S. oleraceus* 19.vii.45 seven midges emerged 13.viii.45, and a further five 7.vii.46—obviously a delayed emergence.

Contarinia steini Karsch.—The yellow leaping larvae of this species I have found in swollen flowers of *Lychnis dioica* Mill. and *alba* Mill. Of the former species, flowers with numerous larvae in them were found in July; these promptly went to earth, the midges emerging during the first two weeks of August. Galled flowers of *L. alba* were found first at the end of June; midges from these larvae emerged in mid-July. Another series taken on 23.viii.47 were full of larvae. These went to earth early in September but no midges have emerged in 1947; this rather points to there being two broods.

Harmandia populi Rübs.—The galls of this species, which had not been previously recorded for Britain, I found first at Ashtead Common in September, 1945: in 1946 further galls were found at Bookham Common and Effingham In July the larvae leave the galls to pupate. The gall is globular, somewhat like that of *H. cavernosa* Rübs., and is likewise situated on the underside of the leaf of *Populus tremula* L.; it differs by being somewhat smaller in size, is thin-walled, and does not project to the same extent on the upper surface of the leaf. I rather think that some of the records of *cavernosa* are referable to this species. The midges emerge in April of the second year.

Harmandia tremulae Winn.—The globular galls of this species upon the upper surface of leaves of *Populus tremula* are not uncommon. In a series collected at Epsom Common 30.viii.45 there were many empty galls; others had the orange larvae of the midge in them. These left the galls to pupate in the earth, midges emerging in the following year between 28.iv and 13.vi. The larvae are heavily parasitized by Chalcids and many of these remain in the galls, the Chalcids emerging from these and from larvae which had gone to earth, in June.

Loewiola centaureae F. Lw.—This is another species where there is probably more than one brood a year. The yellowish galls, which are edged with purple, occur as irregular shaped pustules on leaves of *Centaurea scabiosa* L. and *C. nigra* L.; the lemon-yellow larvae pupate in the earth. From galls collected in mid-June the midges emerged in mid-July; others collected in mid-July gave the midges at the beginning of August.

REFERENCE.

(1) NIBLETT, M., 1942, Notes on some Gall-causing Cecidomyidae: III, *Entomologist*, 75: 42–45.

10, Greenway,
Wallington,
Surrey.

THE ROTHSCHILD-COCKAYNE-KETTLEWELL COLLECTION OF BRITISH LEPIDOPTERA.

A YEAR ago (*Entomologist*, **80** : 147) mention was made of the very generous gift by Dr. Cockayne and Dr. Kettlewell of their joint collection to the Trustees of the British Museum (Natural History), and of the arrangement then made between the parties to amalgamate this collection with the late Lord Rothschild's collection at Tring. Since then great progress has been made. The species so far dealt with are *Arctia caia*, *Spilosoma urticae*, *S. lubricipeda*, *S. lutea*, *Cycnia mendica* and all the Geometrinae, including *Abraxas grossulariata*. These already fill 270 cabinet drawers. The principal purpose of the collection is to show variation of every kind, but especially with reference to genetics. Permission has been given for the incorporation in this collection of specimens from other important British collections in the Museum, such as those of the late E. R. Bankes, Robert Adkin, W. M. Christy and John Levick. Gynandromorphs, somatic mosaics, examples of homoeosis are being included, and the whole collection carefully annotated with references to the published literature. Already a number of hitherto unrecognized aberrations and races have been noted, descriptions of which it is hoped to publish shortly. Several entomologists, to whom this already remarkable collection has made a special appeal, have still further added to its value by presenting examples of varieties, etc., not previously represented in it. These include, to date, the following:

Abraxas grossulariata ab. *inframaculata* Stovin, presented by Dr. Stovin.

Paratypes of *Angerona prunaria* ab. *fuscapicata* Williams and ab. *smartaria* Williams: presented by Dr. H. B. Williams.

Angerona prunaria ab. *fuscaria* Prout: presented by Mr. W. E. Busbridge.

A series of *Rhyacia simulans*: presented by Mr. Austen Richardson.

A series of *Dasypolia templi* from Swanage: presented by Mr. A. G. B. Russell.

A short series of the Tyrone race of *Selidosema plumaria* and the type-specimen of ab. *fumosa* Greer: presented by Mr. Thomas Greer.

Philudoria potatoria ab. *inversa* Caradja: presented by Mr. A. H. Sperring.

Gonodontis bidentata ab. *nigra* Cockayne (2), ab. *fenestrata* Cockayne and ab. *mediorufa* Cockayne (8): presented by Mr. W. Bowater.

A series of 49 Irish *Lycaena phlaeas*: presented by Mr. Dudley Westropp.

Eighteen *Selenia bilunaria* of a dark midland form, and the type-specimen of ab. *nigrofasciata* Gordon Smith: presented by Mr. S. Gordon Smith.

Cabera pusaria ab. *melaina* Oberthür, *C. exanthemata* ab. *approximaria*, *Hemistola chrysoprasaria* ab., *Ectropis bistortata* ab. *defessaria* Freyer (2), *Leucania lithargyria* ab. *marginata* Tutt, and over 1000 Noctuidae and Geometridae, including many aberrations: presented by Mr. A. L. Goodson.

The collection, though kept at the Zoological Museum, Tring, is in the care of the Department of Entomology of the British Museum, and is available to students in the same way as the study collections at South Kensington, but any intending visitors would do well to arrange an appointment with Dr. Cockayne. Recently a party from the South London Entomological Society paid a visit and were, from all accounts, both surprised and impressed.—N. D. Riley.

NOTES AND OBSERVATIONS.

A Gynandromorph Orgyia antiqua.—I was lucky enough to breed a perfect gynandromorph of *Orgyia antiqua* last year from among about 3000 individuals constituting a third generation. The parent generation were obtained as ova from local (Ealing) stock. The third generation larvae fed up very spasmodically, pupating between May and October, 1947, but most of the imagines, including the gynandromorph, emerged in August. The latter specimen has the left side male and the right side female, having one half of the abdomen dark brown and the other grey and distended while its two functional wings are both on the same side. The antennae and legs are also male and female, but I have not as yet examined the genitalia. I should be pleased to hear of any more gynandromorph Vapourers, the only ones of which I have heard having male wings and a female body, two of which were reported in the last century. —M. Locke; 36, Ainsdale Road, Ealing, W. 5.

[There is at least one halved gynandromorph *antiqua* in the collections at Tring Museum.—Ed.]

Early Emergence of Hipocrita jacobeae.—On February 27, 1948, a newly emerged specimen of the above was brought to me by a boy named James Smith of this village. He stated that he had found it drying its wings on the side of a shed. I may add that there is no artificial heat anywhere near the place, but it was a warm, sunny day.—William Quibell; High Street, Brampton, Hunts.

Typical Operophtera brumata in the Hebrides.—In the January number of the *Entomologist* (**81**: 5) I reported the breeding of this species from wild Rhum larvae beaten out of birch, and indicated that, without exception, the form *myricaria* had been reared. That statement was quite true when the article was written. However, not long after typical insects began to appear, as well as additional *myricaria*. In the end, the usual form was well ahead of *myricaria* in point of numbers. In face of these facts, it is quite impossible to maintain the position that *myricaria* constitutes a distinct race.—J. W. HESLOP HARRISON; Dept. of Agriculture, King's College, Newcastle upon Tyne.

ANAITIS EFFORMATA AB. FIMBRIATA AT EGHAM, SURREY.—On the evening of October 13 there flew into my room here a solitary male of this species. I got quite a surprise when I saw its abnormal appearance, with the treble bar absent, replaced by an almost plain background. The insect is referable to the above form, first described by Dr. Cockayne (1946, *Ent. Rec.*, **92**, plate 2, fig. 10) from a specimen taken in May, 1945, at Aston Hill, Bucks. Since then I gather a few of this striking form have been taken outside that area, but this part of Surrey is apparently a new locality for it.—C. G. M. DE WORMS; Milton Park, Egham, October, 1947.

BREEDING ENTEPHRIA FLAVICINCTATA FROM RHUM OVA.—As already recorded (*Entom.*, **81** : 5) *E. flavicinctata* turned up on the mountains of the Isle of Rhum on August 5. From two females captured then and placed in chip boxes fertile ova were readily obtained, and commenced to hatch on August 20 whilst we were on Benbecula. Precautions having been taken to carry a supply of *Saxifraga hypnoides* from Rhum, the young larvae as they hatched were placed on it and throve amain. Toward the end of our stay, when the food was in very poor condition, they continued to do well. When we returned home the larvae were transferred to *Saxifraga trifurcata*, *S. Aizoon* and *S. Geum*, all of which were accepted with avidity. Influenced, no doubt, by the unusual nature of the food in the case of the latter two species, the larvae attacked the leaves from the lower side and left the upper epidermis untouched. Attempts were also made to feed the larvae on *Salix viminalis* and *Polygonum heterophyllum*. They were not happy on the latter plant, but could have been reared on it; the willow they merely nibbled. With the exception of a very few individuals, the larvae pupated during the second and third weeks of October. Thus my observations confirm the view that *E. flavicinctata* is partially bivoltine in captivity.—(Prof.) J. W. HESLOP HARRISON; Dept. of Agriculture, King's College, Newcastle upon Tyne.

TRANSPLANTING OF LOCAL INSECTS.—The Committee for the Protection of British Insects of the Royal Entomological Society of London has recently had under consideration the desirability of keeping records of attempts to introduce British Insects into new habitats. It is believed that many entomologists have made experiments of this nature which are nowhere recorded, and may therefore confuse local records. The Committee would welcome information concerning activities of this kind so that it may be filed in the Society's rooms, where it would be treated as confidential and made available only for approved investigations.—N. D. RILEY, *Honorary Secretary*.

APLASTA ONONARIA COLONIES.—It has come to the notice of the Protection Committee of the Royal Entomological Society of London that at the moment there exist one or two isolated colonies of this insect in this country, perhaps resulting from migrant parents. Entomologists are asked, if they happen on these colonies, to refrain from disturbing them or taking specimens, and to do their utmost to preserve them.—N. D. RILEY, *Honorary Secretary*.

WICKEN FEN FUND.—This fund is raised annually by entomologists and other nature-lovers to assist in defraying the expenses incurred by the custodians of Wicken Fen (The National Trust) in administering the Fen, preserving the fauna and flora, and in providing a watcher. The Fen is unfortunately very inadequately endowed, and its maintenance places a severe strain on the resources of the Custodians, who for many years have had to contribute a considerable sum of money annually towards its upkeep. It is not possible to maintain the Fen with fewer than the present staff, and owing to the increase in agricultural wages the future cost of upkeep is likely to be in the neighbourhood of £800 per annum. It is therefore estimated that there will be a deficit of approximately £350 in the present year. Once again the local committee of management appeals to all nature-lovers, to whom it is greatly indebted for their help in the past, to contribute towards this very desirable object. Contributions should be sent to the Hon. Treasurer, H. M. Edelsten, O.B.E., Bramble Hill, Balcombe, Haywards Heath, Sussex, who will be pleased to send permits for observation or collecting to subscribers on application. The amount of the fund in 1947 was £93.

VIIITH INTERNATIONAL ENTOMOLOGICAL CONGRESS, STOCKHOLM, AUGUST 9–14, 1948.—As doubts have arisen about the method of reserving hotel accommodation for this Congress, I am asked to let it be known that the local Secretariat is reserving rooms on the basis of the details given in the application form for membership. The phrase " I wish . . . . . . rooms, etc." is apparently being taken as an instruction to reserve rooms. The cost of single rooms is stated to be 6 to 10 Swedish crowns, double rooms 10–20 crowns, with a supplementary charge of 10 per cent. and service 15 to 30 per cent. It is not yet clear what meals (if any) these charges include. Messrs. Thomas Cook & Son are organizing travel arrangements. Membership fee is 50 crowns, and further particulars can be obtained from the Congress Office, Stockholm 50, Sweden. Owing to the extreme pressure on transport facilities, entomologists proposing to attend the Congress should make application for reservations at the earliest possible moment.—N. D. R.

ARGYNNIS LATHONIA AND APORIA CRATAEGI IN SUSSEX, 1947.—A Plymouth schoolboy (C. Rosewall) recently told me that while on holiday at Hove last year he took what he thought were the Black-veined White and the Queen of Spain Fritillary. He was able to produce these specimens (one set on an ordinary pin), and they proved to be males of the species stated. Both were taken within a mile of Hove during the last week of July and the first week of August. The *A. crataegi* was taken flying in long grass among other Whites; its rubbed condition bears out this statement.—F. W. JEFFERY; 24, Woodland Terrace, Greenbank, Plymouth.

NYMPHALIS IO IN PERTHSHIRE.—In the warm sunshine of the afternoon of Good Friday, March 26, 1948, I was walking up the Braes of Doune towards Uum Var, Perthshire. Along a dry wall stone dyke I stopped to watch dozens of *Aglais urticae* flying up and down its western side. I was delighted to see a single specimen of *N. io* settle on the wall and sun itself for almost a minute before strongly flying away to the north. I kept a keen look-out for further peacock butterflies after that, but encountered only the small tortoiseshell. As this locality would be approaching the 2000 feet level and in view of the northern range I think I should record the event.—H. C. S. HALTON, Curator, Natural History Museum; Wollaton Hall, Nottingham.

CELASTRINA ARGIOLUS IN N. YORKS.—During the first fortnight of May I discovered a small colony of *Celastrina argiolus* near Middlesbrough, N. Yorks. I saw about twenty of these butterflies flying around hollies in some large private grounds. Mr. P. Newson, of Guisbrough, has also found this butterfly at Hutton Gate during the past week.—N. W. HARWOOD; 37, Stoneyhurst Ave., Acklam, Middlesbrough, N. Yorks, May 12, 1948.

POLYGONIA C-ALBUM AND CELASTRINA ARGIOLUS IN LINCS.—On April 11 I observed here a butterfly which had a very unfamiliar appearance. After several attempts I boxed it while it was feeding on sallow bloom. It was a *Polygonia c-album* with the typical deep tawny ground-colouring of the upperside whitish, the other markings unaffected. This is the third *P. c-album* I have seen in this district. Another insect new to me was a fresh female *Celastrina argiolus* which I took from a sallow growing in a small garden in a built-up area on April 19.—J. H. DUDDINGTON; 5, Normanby Road, Scunthorpe, Lincs.

OVIPOSITION BEHAVIOUR OF GONEPTERYX RHAMNI.—On April 18 I was in a wood near Effingham, Surrey, where a lot of the big timber had been felled during the war and the place is now largely covered with young specimens of *Betula verrucosa*. As I walked slowly along through these bushes a female *G. rhamni* settled on a shoot two feet in front of my face. I stood and watched her fix her feet as if for oviposition on a young leaf. She curled the abdomen round, but the moment its tip touched the leaf the butterfly flew off to settle on another branch. This process was repeated four more times on the same tree. I at once searched each spot through a pocket lens, but there was no sign of an egg. She flew away further along my path, and a few minutes later I saw her settle again on birch, but I was not near enough to see the exact leaf. Two questions seem to arise from the incident. To the butterfly is the scent of *Betula verrucosa* similar to that of *Rhamnus frangula*? And is the tip of the abdomen so sensitive that it can tell at a touch that the leaf is not that of the desired food-plant ?—H. J. BURKILL ; Brincliffe, Fetcham, Surrey.

DAPHNIS NERII IN FLINTSHIRE.—A specimen of *Daphnis nerii* captured by a boy in the school yard of Merllyn County Primary School, Bagillt, Flintshire, June or July, 1947, was sent to me by the Headmaster, Mr. G. M. Jones, M.R.S.T., on April 5, 1948.—F. GORDON SMITH, F.R.E.S., F.L.S. ; Estyn, Boughton, Chester.

ACHERONTIA ATROPOS IN MAY.—On May 5 a live female Death's Head Hawk Moth (*A. atropos*) was brought to me by Mr. H. Plumbley. He had found it at rest during the afternoon in his garden at Niton. It was in good condition.—(Rev.) W. D. W. GREENHAM ; St. Anne's, Niton, Isle of Wight.

NYMPHALIS POLYCHLOROS RECORDS.—The number of reports recently received seem to indicate that *N. polychloros* is definitely following the example of its lesser cousin *Polygonia c-album* and staging a come-back on a considerable scale. Mr. C. Gummer reports seeing five in a local wood in E. Kent in April, 1947, a fresh one in his house at Deal on June 27, and another in the same wood on July 2. Mr. W. E. Busbridge records seeing one in Knole Park, Sevenoaks, on March 9, 1948, the third in Sevenoaks of recent years. On March 14 one was seen at Shadbolt Park, Surrey, by Mr. A. E. Stafford, and another was seen at Friday Street, also in Surrey, by Mr. A. E. Gardner on March 26. In Hampshire Lieutenant Rockingham, R.N., saw one in his garden in Hayling Island, and captured one (perhaps the same one) a mile away less than an hour later ; two were taken by Mr. Bruce Burns in a large wood on the outskirts of Fareham the next day. In Essex one was watched for over an hour in Epping Forest on March 28 by Mr. E. W. W. Durant ; and Mr. W. P. Seabrook, writing from Frinton-on-Sea, reports its presence as " general." Mr. R. Gerard observed one at Fakenham, in Norfolk, on April 23, but this is perhaps not so surprising (I remember seeing it commonly not far away about 1906) as a record from Cornwall, whence Mr. D. E. Bowden reports a singleton at Newlyn on April 13, 1946.—N. D. RILEY.

EARLY EMERGENCE OF EUCHLOË CARDAMINES.—I am informed by Sir William Parker, of Llangattock Court, Llangattock, Crickhowell, Breconshire, that on the morning of Tuesday, March 23 of this year, he saw a male of this species flying in his garden. The day was brilliant and sunny and the maximum shade temperature reached 56° F. This must be an early date for the emergence of the Orange Tip. I have never seen them out in March.—R. G. SANDEMAN, F.R.E.S. ; Dan y Parc, Crickhowell, Breconshire.

POLYGONIA EGEA CRAMER IN MALTA.—On March 20, 1948, at 3.10 p.m. while I was collecting at Wied Is-Sewda, an arid valley in the district of Attard in the central part of the island, I took, to my great surprise, a *Polygonia egea* in a very good condition. This is the only specimen I have come across since I began collecting. A similar find has never been recorded ; at least it is not mentioned in the last publication by the late P. Borg, F.C.S., F.Z.S., which includes all recorded captures to 1932. It may be of interest to point out that on that afternoon I also noticed an unusual number of *Pontia daplidice*, mostly males and worn.—ANTHONY VALLETTA F.R.E.S.; 214, Msida Str., B'kara, Malta.

ISIA ISABELLA (ISABELLA TIGER MOTH) ACCIDENTALLY INTRODUCED.—An egg-carton, packed and sealed in Canada, arrived on November 18, 1947, at a United Dairies branch shop in Old Brompton Road, S.W. 7, and was found to have contained a larva of this moth on the 24th. At first it refused ragwort, chrysanthemum, water-cress, parsley, celery and mallow leaves, although it showed most interest in ragwort and parsley. It was kept indoors, and I later found that it only became active and nibbled parsley leaves when there was a fire in the room. This was probably merely for the sake of the water in the leaves, for at the most it passed only three pellets of excrement in a single day, and normally remained dormant. On January 25 the larva commenced spinning a cocoon, in which it pupated on February 2, not having undergone any previous ecdysis whilst in my care. On March 13, between 4 and 5 p.m., a perfect female emerged, the glass jar containing the pupa having remained an hour or two out of doors in sunlight on each of the previous few days. *Isia isabella* (Abbot and Smith) is typically a species of boreal America and Canada, where it is quite common, the moth flying in the summertime. The larva has been aptly described as "the hedge-hog caterpillar."—P. A. D. LANKTREE; 3, Sydney Place, S.W. 7.

NOTES ON PRECIS LAVINIA.—Two recent papers in the *Entomologist* (Corbet, **81** : 54; Eliot, **80** : 283) call for comment. I am at a loss as to how Dr. Corbet can combine *lavinia* with *orithyia*; his own figures show the genitalic differences plainly—the more even upper margin of the valve, and the more nearly equal terminal lobes in *lavinia*. In both points the other old-world species agree with *orithyia*, and *vestina* with *lavinia*, though his figure of *lintingensis* (the familiar *oenone* or *cebrene*) does not show the upper outline of the valve.

As to Col. Eliot's queries to me, I consider the absence of marine Jurassic deposits along the Atlantic coast not to be too significant, since such a wide zone of the Continental Shelf is submerged. I think the " orange patches " of *villida* were mainly formed of the enlarged outer ring of the eyespots, with a small contribution from the orange ground; but I think that in *vestina* the orange is mainly the ground-colour, with a small contribution from the rings of the eyespots, which are still faintly visible in one of my specimens. I think the orange ground was original, being the tawny ground common to so many Nymphalines, slightly exaggerated. I used the presence of a Miocene *Hypanartia* in Colorado (*Prodryas persephone*), not for evidence on the former migration line of the genus so much as an index of the tropical character in the Miocene, at a latitude now cool temperate. It shows that *Hypanartia* could then be at home in a zone now closed to it, so that a line of migration in the northern hemisphere between South America and Africa might then be possible, but gives no suggestion of the direction of migration.—Wm. T. M. Forbes.

Catalogue of the Lepidoptera of France and Belgium.—It is understood that difficulties have arisen over the printing of the final part of this useful work by M. L'homme, its author. Apparently all is ready for the press, but costs in France have recently risen so steeply that M. L'homme is unable to meet the expense involved. If any lepidopterist is in a position to help the author, will he please communicate with him direct, or through Mrs. V. M. Muspratt, Aïcé Choko, St. Jean de Luz, B.P., France.—Ed.

Danaus plexippus at Cranleigh, and Other Notes.—On March 25 I found a male of *Agrotis ipsilon* at rest by day under a sack beneath a sallow bush in my garden at Cranleigh. This and other previous records once again raise the issue as to whether these are early immigrants or hibernated individuals.

On May 16 I observed, also in my garden, a male *Anthocharis cardamines*, which was making a somewhat violent courtship to what I took to be a rather exhausted example of its opposite sex. Time and again he succeeded in manouvring her down to the ground and the flirtation continued nonstop for about four minutes—long enough for my son to go indoors and get my net. I caught them as they appeared to be on the point of copulating, and was greatly surprised to find that the female in the case was a *Leptidea sinapis* in newly hatched condition. This latter insect, though occurring fairly commonly a few miles away in this district in neighbouring woods, has never been observed by me within five miles of my house. Various aberrant courtships of *A. cardamines* have been recorded from time to time (e.g. with *Bapta temerata*, etc.), but I am not aware of *L. sinapis* being involved before.

On May 16 the Rev. Hugo Johnstone informed me that an hour earlier in the afternoon he had watched a *Danaus plexippus* disporting itself among Azalea bushes at Vachery, near Cranleigh. He watched it for a period of about ten minutes, and at one time got within three feet of it. He stated that it appeared interested in other butterflies present in a clearing, but for the most part it patrolled from one side to the other and back again. He had no doubt whatsoever in his identification of the insect. I visited the spot immediately and subsequently but failed to see it, so presumably it had moved on. May records of this species are exceedingly rare; in fact I believe that there are only four.—Dr. H. B. D. Kettlewell; The Common, Cranleigh.

A Further Record of Anania nubilalis in Kent.—As recent records of this insect in Kent appear to be very few (I have only been able to trace the two taken at Folkestone by Mr. Morley, *Entomologist*, **80**: 141), I wish to record that amongst some insects recently sent me for identification by my friend Mr. P. F. Harris, of Whitstable, was a worn female *nubilalis* which came to light there on July 23, 1946.—H. C. Huggins; 875, London Road, Westcliff-on-Sea.

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BRITISH LEPIDOPTERA COLLECTING, 1947.

BY C. G. M. DE WORMS, PH.D., F.R.I.C., F.R.E.S.

(Concluded from p. 140.)

During the latter half of August larvae of *Apatele aceris* were extremely common in London, especially in the South Kensington district. It was often possible to find two or three curled up on a well-eaten leaf of sycamore, usually a shoot growing from the base of the trunk. The heat wave continued without a break throughout the month, and I had another very warm day when I joined Commander Harper in Sussex on August 24, but there was little on the wing in the woods, so we concentrated on beating. Our "bag" included full-fed *Stauropus fagi*, many *Bena fagaria* and a few *Notodonta dromedarius*. That evening we took *Nonagria sparganii* flying at dusk in a local marsh.

For the last week-end of August Mr. C. Dixon and I set out on the morning of the 29th by road, reaching Mullion in Cornwall in the early evening. Along the whole route wherever we halted we saw *C. croceus*, and as we got further west it became increasingly common. We were lucky enough to put up at an excellent farmhouse near Kennack Bay. For our first night operations we pitched our lamps in Poltesco Cove near the Lizard, but our main visitors were only *Tholera cespitis*, *T. popularis* and *Hadena trifolii*. It was a glorious day on the 30th when we went to Kynance Cove. Here *C. croceus* was in great numbers, together with *Vanessa cardui* and *V. atalanta*, of which I counted eight on one flower-head of hemp agrimony. But in spite of assiduous searching under *Silene maritima* and rock spurry we could not find a trace of larvae or pupae of *Hadena barrettii*, which was apparently generally scarce. That night we sugared the well-known stretch of cliff near Mullion, but only took a single *Polia xanthomista*, which arrived about 10 p.m. Apart from this local speciality there were many *Peridroma porphyrea* (*saucia*), *Hadena trifolii* and *Apamea secalis*, but nothing came to the lamps or to flower-heads.

The following morning we explored Kennack Bay. Mr. Dixon was lucky enough to discover a small sheltered valley running up from the sea where fleabane was in profusion, with a sprinkling of clumps of hemp agrimony. Here we found *Colias croceus* in the greatest profusion, with a predominance of females and a good proportion of f. *helice*. *Vanessa cardui* and *V. atalanta* were again abounding, while *Macroglossum stellatarum* was flitting in all directions. I was also surprised to find worn *Lysandra corydon*, not often reported from this part of Cornwall. Late in the afternoon we came across a number of drooping foxglove stems, all of which contained pupae of *Gortyna flavago* (*ochracea*). I have seldom seen so many butterflies on the wing together under such ideal conditions. That evening we revisited Mullion. At dusk I stood sentry over a single tobacco plant in a private garden, and got a great thrill when a huge *Herse convolvuli* suddenly hovered over it. It turned out to be a perfect female. Of the hundred insects counted on the sugar there was only one further *Polia xanthomista*, with many *Peridroma porphyrea* (*saucia*), *Agrotis ipsilon* and *Hadena trifolii*. On September 1 we set out once more for home after a most refreshing and profitable week-end.

September turned out almost the best month of all for collecting and for quantities of Lepidoptera, especially as the weather remained fine and warm almost without a break till well on into the autumn. On the evening of September 4 I accompanied Capt. Jackson to Canvey Island, which I had not seen since before the War. Larvae of *Euchloris smaragdaria* proved quite abundant. By lightly tapping the clumps of *Artemesia* it was possible to obtain several larvae at a time as well as by spotting them at rest on their food-plant. On the 6th I revisited Salisbury to stay with Col. Hawley, but the week-end was not very productive. We were very surprised when a *Rhodometra sacraria* female appeared in the house at Bodenham, as we little anticipated the subsequent profusion of this formerly rare migrant geometer. In the stubble fields there was a swarm of *Scopula amata*, while *Lycaena phlaeas* was starting to appear in numbers as a third brood.

Yet another good week-end welcomed Mr. Dudley Marsh and myself when we travelled to Swanage on September 12. That evening, in company with Mr. Archibald Russell, we visited the downs towards Studland, and by searching the short grass after dark we managed to find a few *Heliophobus hispidus* at rest. Otherwise insects were reluctant to appear at our lamps, except *Tholera cespitis* and *T. popularis*. The morning of the following day was one of the few rainy occasions during the month. We accompanied Mr. Russell to a restricted area on the downs, where *R. sacraria* had been found emerging in numbers a few days before. We were lucky enough to kick up a few from the rough herbage, and still more later in the day when conditions had improved. They were very variable and most fascinating to watch at rest, and in their habit of flying a short distance and then settling. In the evening we motored over to the Dorchester district and tried our lamps in a wood, but the only visitors were a male *Trichiura crataegi* and some *Ectropis bistortata*. When we returned after midnight to Mr. Russell's house we found his light trap attracting a continuous stream of moths, mostly noctuids.

Insects were still coming freely at 5 a.m. Mr. R. Demuth joined us on the 14th and took us over to Portland, where we had not much difficulty in sweeping and beating out a good number of larvae of *Cucullia absinthii*, mostly from isolated patches of the *Artemesia*. Another night, this time in the Lighthouse Valley, only attracted *H. hispidus* to our lamps and further *A. australis* and *H. lichenea* at the moth-trap. Sugar was unfruitful, hardly an insect coming to the patches we put along the cliff or inland fences. We finished up our stay with some more *Rhodometra sacraria* on the morning of the 15th.

On September 20 I was again at Lowestoft. That evening Mr. P. Burton and I went over to a coastal stretch near Southwold. On a concrete post I was about to sugar I was surprised to spot a male *Herse convolvuli* at rest, but little came to light or to the patches, and our only capture of interest was a *Laphygma exigua*. On the 21st, another of the few rainy days, we made a tour of the northern part of the county, and just over the border in Norfolk Mr. Burton took a fresh male *Colias hyale*. *Lycaena phloeas* was becoming very abundant, and we saw a good many *M. stellatarum*. Back in Surrey fairly late on the 23rd I accompanied Mr. Howell to a stubble field near Worplesdon. Here we took a stray *R. sacraria*, of which a number had been obtained there a few days before. We also saw, but missed, a *convolvuli* flying over tobacco plants in Mr. Howell's garden nearby.

Lycaena phloeas was swarming when I visited my brother near Chelmsford on September 27, and I have seldom seen so many butterflies in the early autumn. *Vanessa cardui* and *Aglais urticae* were especially common. These species were also well to the fore near Petworth on the 28th, where, on a rough piece of ground bordering a wood, several *R. sacraria* occurred.

The fine weather never seemed to come to an end, and October opened with a gloriously summerlike spell with temperatures well in the "seventies." Naturally the discovery of *Sedina buettneri* in the Isle of Wight in 1945 had attracted the attention of many collectors. This season seemed to offer a good chance of success. Mr. Bretherton and I, therefore, set out on October 4 for Freshwater, only to find that other enthusiasts had similar ideas. Mr. Bretherton and I soon after arrival confined our attentions to a clover field on the slopes of Tennyson's Down, where we found *Colias croceus* emerging in large numbers, and it was not long before we had taken a fine series, including many very good forms of ab. *helice.* I have never seen such a profusion of butterflies at this late period of the year. There were swarms of *L. phlaeas* and any number of *Aglais urticae, V. cardui* and *V. atalanta,* together with *Pararge megera* and a few late *Eumenis semele,* largely on the Michaelmas daisies. Well before dark we all took up a pitch in the restricted marshy area where *S. buettneri* occurs. About half an hour before dusk the males started to fly, careering swiftly over their food-plant, the *Carex.* By agile sweeps of the net several of these were secured, nearly all in fresh condition, but owing to the mist that rose, none were seen at the lamps or flying late. A few *Calamia lutosa* were found at rest among the reeds.

October 5 turned out a superb day. We set out early in an easterly direction along the cliffs and soon came on *C. croceus* again in plenty everywhere. We obtained some extremely fine ab. *helice,* of which we must have seen quite fifty. While bathing we found on a rock remains of a *Rhodometra sacraria,* of which others were reported in the neighbourhood by other collectors. We again tried our luck in the marsh, where further *S. buettneri* appeared early, though not quite so many as on the previous evening, and once more none seemed to have a late flight. A single *Gortyna flavago* (*ochracea*) turned up at one of the lamps. We returned home on the 6th after a very entertaining and successful trip.

Though October turned out another very fine and dry month, collecting certainly by night hardly came up to expectations. I spent the middle fortnight at Egham, but there were very few insects either at light, sugar, or especially at ivy blossom. This seems to have been the general experience in most other parts for this period. By day, however, *Aglais urticae, Pararge megera* and *L. phlaeas* continued in plenty with a good sprinkling of *Colias croceus,* which was comparatively abundant till the end of the month. The commonest geometer at Horsell during October was *Chesias legatella* (*spartiata*).

The next expedition, on November 7, took me to Minchinhampton on a visit to Mr. Austin Richardson. That evening, which was very mild and drizzly, we drove over to a wooded spot full of sycamores. Immediately we put down our lamps, at 8 p.m., we were greeted with the arrival of fresh male *Ptilophora plumigera,* but up to 10 p.m. we only saw five together with a run of male *Poecilocampa populi, Himera pennaria, Cheimatobia fagata* (*boreata*) and some fine forms of *Erannis defoliaria.* On the 8th Mr. Bretherton joined me at Stroud and we were on the ground by 5.30 p.m.

Conditions were again ideal. The first *plumigera* arrived at 6.30, and thereafter up till 8.30 we had a steady stream at the sheets, the majority coming between 7 and 8 p.m. In all we saw 22, all males and just out. The Cotswold race of this Prominent is much larger, and has the markings far more clearly defined than those from the Kent downs and Suffolk. The rest of November was, on the whole, very mild and rather wet. Very little profitable collecting was carried out. The last outing of the season was a visit to Mr. Ian Heslop at Burnham-on-Sea on December 12. The night was very warm for the late time of year. The following morning we found quite a congregation of *Poecilocampa populi*, including a female, at rest under the porch light. Apparently there was a big emergence of this species in many areas over this week-end. The year ended with a flood of *Erannis defoliaria*, which was more abundant than for a long time.

In conclusion, 1947 can for many reasons be looked back upon as an outstanding season like that of 1945. It was certainly one of extremes. After the most severe winter of the century there followed a summer of almost unbroken sunshine and heat covering four months. These unusual conditions had a marked effect on the Lepidoptera. On the adverse side, apart from a very productive period during the latter half of June, comparatively few insects were observed at the sugar patches, while in most parts of the country those attracted to light and flowers were far below normal numbers. In spite of these drawbacks most day-flying species, such as *Aglais urticae* and *Vanessa cardui*, were in great plenty. The prolonged period of fine weather was no doubt responsible for the continuous emergence from July onwards of *Colias croceus*, for which it was the most remarkable season for at least 70 years. Its relative, *C. hyale*, was also in profusion, chiefly in the south-eastern area. Among the moths there were many records of migrant species of rare occurrence, but the appearance in the late summer and autumn of unprecedented numbers of *Rhodometra sacraria*, mainly over the central part of southern England, brought to a fitting end a very memorable year.

26, Common Close,
Horsell;
February, 1948.

NYMPHALIS ANTIOPA IN NORTHUMBERLAND.—A specimen of *N. antiopa* was taken on April 16 by Mr. C. F. Blunt in his garden at Riding Mill, Northumberland. It is a male in poor condition.—F. W. GARDNER; Riding Mill, Northumberland.

INSECTS TAKEN AT SEA, AUGUST TO OCTOBER, 1947.

By Surgeon Lieut.-Cmdr. H. M. Darlow, F.R.E.S., R.N.

Over two hundred insects of four orders and at least twenty species were taken or otherwise observed at sea between August 18 and October 23 under circumstances which suggest that they were not stowaways. A daily record was kept of insects seen on the exposed parts of the ship, and any specimens taken within the ship were excluded from the record if there was the slightest doubt that they might have come aboard at the last port of call, or were breeding in some part of the ship. The reasons for suspecting that the recorded insects did not board the ship in harbour but arrived whilst the ship was at sea are as follows:

(1) Half the recorded species are known to be regular migrants and could have been migrating at the above time of year.

(2) In many instances the insects were actually seen to fly on board and their direction of flight observed.

(3) Some of the species were rare or absent at the last port of call, or were very unlikely to have flown on board in harbour.

(4) The ships were carefully searched prior to sailing, especially the deck lights at night.

(5) In several instances no insects were seen during the first day or two at sea owing to unfavourable weather conditions, or to the unfavourable position of the ship in relation to probable routes of migration.

The great majority of insects were actually captured on deck and killed so as to avoid duplication of records. Many of those not captured could be identified with certainty, such as *Macroglossum stellatarum* and *Colias croceus*. Few insects failed to alight on the superstructure and allow inspection, and the deck lights at night were a fruitful source of material. It was noticed that certain parts of the ocean were more frequented by insects than others, especially the English Channel, and off the coast of Algeria. These positions lie on theoretical transoceanic migration routes. Places off the beaten track, such as the Atlantic coasts of Spain and Portugal, produced no records. Where insects did occur, they were in numbers and represented several species or even orders.

Wind force played an important part in the apparent presence or absence of insects at sea. No insects were seen when the wind force was greater than force three (and I do not think I missed observing them owing to their failure to be able to alight on deck owing to the force of the wind). Either they do not attempt a sea crossing in rough weather, or they get blown down into the sea.

The great majority of records were made when the wind force was two or less.

If the nearest land is to be considered the source of the insects observed, then wind direction at low velocities plays a very much less important part than wind force in modifying the numbers seen. For example, at 8.15 p.m. on September 20, in position 37° 10′ N., 5° 0′ E., nineteen miles off the coast of Algeria, *Agrotis ypsilon*, *Laphygma exigua*, *Nomophila noctuella* and *Tegostoma comparalis* were all taken at the same light on deck, the wind being W.N.W. and of force two to three. Yet it seems most probable that these insects had flown from Algeria, off which the insect density was very much higher than more northerly latitudes of the western Mediterranean. In fact, on October 21 over 120 insects were observed in twelve hours along the same stretch of coast, many of which were undoubtedly flying towards the north, despite a force two easterly wind.

I am indebted to Mr. W. H. T. Tams, of the British Museum, (Nat. Hist.), for the identification of some of the moths, and to Mr. H. Oldroyd, also of the British Museum, for the identification of the syrphids.

The insects recorded were as follows (all times quoted have been reduced to G.M.T.):

LEPIDOPTERA.

Vanessa atalanta.—August 18, at 7 p.m., 100 miles W.N.W. of Ushant, wind being N.W. and force 2, two *V. atalanta* were seen to fly aboard from an easterly direction, both of which were captured. Two more were seen the following day in the Bay of Biscay. but may have come aboard the previous night.

Colias croceus.—September 20, at 1 p.m., in position 37° 19′ N., 7° 02′ E., 15 miles off Algeria, wind N.E. and force two, one *C. croceus* was seen to approach the ship from a southerly direction, and flew along the ship's side for a short distance, eventually flying off to the north. Estimated speed of flight was twelve miles per hour, judged by the speed of the ship.

October 21, at 5.30 p.m., in position 37° 14′ N., 05° 55′ E., 22 miles off Cape Bougeroni, Algeria, wind E. and force one, one specimen seen, but direction of flight not observable.

October 22, at 8.45 a.m., in position 36° 50′ N., 01° 35′ E., 19 miles off Cape Tenez, Algeria, wind E. and force two, one specimen found sitting on deck, which flew off in a northerly direction.

Macroglossum stellatarum.—September 20, at 6.30 p.m., in position 37° 10′ N., 5° 34′ E., 23 miles off Algeria, wind W.N.W. and force two, at least two individuals suddenly arrived on board from an unidentified direction and flew round the ship, disappearing as suddenly as they arrived. Estimated cruising speed was 17 m.p.h.

October 9, at 4.20 p.m., in position 37° 18′ N., 12° 10′ E., 28 miles off Cape Granitola, south-west Sicily, wind S. and force two, one individual circled the ship and disappeared.

October 21, at 8.35 a.m., in position 37° 27′ N., 8° 24′ E., 34 miles off Cape Rosa, Tunis, wind E. and force two, a similar record.

October 22, at 8.50 a.m., in position 36° 50′ N., 01° 35′ E., 19 miles off Cape Tenez, Algeria, wind E. and force two, a similar record.

Agrotis ypsilon.—September 20, at 8.15 p.m., in position 37° 10′ N., 5° E., 19 miles off Algeria, wind W.N.W. and force two to three, one specimen taken at light.

Laphygma exigua.—September 20, under identical circumstances as *A. ypsilon* (see above), one specimen taken at light.

October 21, at 5.10 p.m., in position 37° 14′ N., 5° 55′ E., 22 miles off Cape Bougeroni, Algeria, wind E. and force one, one specimen taken on deck. A further specimen was taken at light at 6.45 p.m. a little further west and 28 miles off Ras Afia, Algeria, wind E. and force two.

Eublemma ostrina.—October 22, at 11 p.m., in position 36° 21′ N., 02° 23′ W., 26 miles off Cape de Gata, south coast of Spain, wind N.E. and force one to two. One specimen was taken at light, but it is possible that it flew on board some hours earlier, as the particular light had not been searched since 8.15 p.m.

Plusia gamma.—At least three were seen on August 18 between 8 and 9 a.m. off the Bristol Channel. They may have been attracted to the ship's lights during the night whilst passing through the Irish Sea. On August 19 six were seen and two more taken whilst the ship was crossing the Bay of Biscay. The wind on both days was northerly and of force two.

Rhodometra sacraria.—October 2, two specimens were taken on board when the ship was approaching the entrance of Aranci Bay, North Sardinia. These may have come aboard together with *N. noctuella* (*vide infra*) when the ship was passing through the Bonafacio Strait during the small hours of the morning.

October 8, at 3.50 p.m., in position 40° 05′ N., 10° 22′ E., 28 miles off the east coast of Sardinia, wind S.E. and force two to three, one specimen seen.

October 21, at 5 p.m., in position 37° 14′ N., 5° 55′ E., 22 miles off Cape Bougeroni, Algeria, wind E. and force one, one taken, which appeared to arrive from a southerly direction.

October 22, at 4.30 p.m., in position 36° 36′ N., 00° 35′ W., 44 miles off Cape Ferrat, Algeria, wind E.N.E. and force two, one taken.

Tegostoma comparalis.—September 20, at 8.15 p.m., under identical circumstances to *A. ypsilon* (*vide supra*).

Nomophila noctuella.—September 20, at 7.45 a.m., in position 37° 28′ N., 8° 35′ E., 30 miles off the north coast of Tunis, wind S.E. and force three, one seen to fly over the deck and disappear northwards. On the same day at 8.15 p.m. two further individuals were taken at light under the same circumstances as *A. ypsilon* (*vide supra*).

October 2, at 4 a.m., in position 41° 28′ N., 8° 24′ E., 9 miles west of Aquila Point, Corsica, wind W. and force two, one specimen taken at light. Two further specimens were taken whilst the ship was entering Aranci Bay, North Sardinia, at 11 a.m., which may have come aboard during the night.

October 8, at 6.45 p.m., in position 30° 30′ N., 10° 47′ E., 52 miles off Cape Palmari, Sardinia, wind S.E. and force two to three, one specimen taken at light.

October 10, at 1.10 p.m., in position five miles due east of Grand Harbour, Valetta, Malta, wind S.E. and force two, a single specimen taken.

October 21, between 8 a.m. and 8 p.m., and positions 37° 27′ N., 08° 24′ E., and 37° 10′ N., 05° 03′ E., at distances between 12 and 34 miles from the coasts of Tunis and Algeria, at least 100 were seen, the majority being taken and killed. The remainder were either seen to leave the ship, or were seen to be eaten by a flock of Robins, which invaded the ship. The wind varied in direction between E. by N. to due E. and in force between force three in the morning to force one in the afternoon and evening. During the hours of daylight they continued to arrive in a constant stream, and seemed to arrive from the south.

October 22, between 8.45 a.m. and 6.10 p.m. and between positions 36° 50′ N., 01° 35′ E., 19 miles off Cape Tenez, Algeria, and 36° 33′ N., 01° 02′ W., 49 miles off Cape Falcon, Algeria, 24 were taken, the wind varying from E. and E.S.E. in the morning to E.N.E. and N.E. in the afternoon and evening, and remaining constant at force two all day. No explanation can be offered for the sudden cessation of captures at 6.15 p.m. when the ship was mid-way between Africa and Spain. The wind had already backed to N.E. and other species continued to be taken aboard, though admittedly in reduced numbers and in different ratios between the numbers of each species. None came aboard during the night off the south coast of Spain, nor on the following morning whilst passing through the Straits of Gibraltar. Perhaps it is significant that I saw no *N. noctuella* in Gibraltar in September, though it appeared extremely common in other western Mediterranean countries.

Hapalia martialis.—October 21, at 11.20 a.m., in position 37° 22′ N., 07° 34′ E., 22 miles off Cape Turkush, Tunis, wind E. by N. and force two, two specimens taken. At 12.45 p.m. a little further west two more were seen, but flew away astern. A fifth was taken at 7.20 p.m. together with *B. lanceolata* (*vide infra*).

October 22, at 8 p.m., in position 36° 30′ N., 01° 33′ W., 30 miles off Cape de Gata, South Spain, wind N.E. and force two, three specimens were taken at light.

Bactra lanceolata.—October 21, at 7.20 p.m., in position 37° 11′ N., 05° 14′ E., 25 miles off Cape Carbon, Algeria, wind E. and force one, a single specimen taken.

Plutella maculipennis.—October 21, at 6.45 p.m., in position 37° 12′ N., 05° 24′ E., 28 miles off Ras Afia, Algeria, wind E. and force two, one specimen taken at light.

Bedellia somnulentella.—October 22, at 3.20 p.m., in position 36° 39′ N., 00° 15′ W., 40 miles off Cape Ivi, Algeria, wind E. by N. and force two, a single specimen taken.

Apart from those Lepidoptera recorded above numerous others were seen, but as they were not identified it is not considered worth while to describe the circumstances under which they were observed. The concentrations of moths off the north coast of Algeria are noteworthy, but perhaps even more so was the absence of *Plusia gamma* in the swarms. This species had increased in considerable numbers in Malta during the second and third weeks of October, and frequently came on board in harbour. In fact its absence at sea is a further point in favour of the other species being *bona fide* travellers and not stowaways.

It can, I think, safely be assumed that the few macrolepidoptera of large size and powerful flight, that are known to be of migratory habit, were in fact actually migrating, but the presence of their weaker brethren in such large numbers is mysterious. It may be that they were carried upwards by powerful up-draughts from the heated coast and later deposited by down-draughts at sea, but the prevailing weather conditions provided no clues to further this theory. The general impression gained at the time was that the insects were flying north from the coast of Algeria.

ODONATA.

Unidentified Dragonflies were seen on the following occasions: August 22, at 10.40 a.m., within sight of the north coast of Tunis, wind N.E. and force two. October 21, at light at 9 p.m., about

20 miles off the coast of Algeria, near Cape Carbon, wind E. and force one.

NEUROPTERA.

October 21, at 8.30 p.m., under similar conditions to the second Dragonfly, a small green lace-wing was seen at light.

DIPTERA.

October 23, whilst the ship was passing through the Straits of Gibraltar at 9 a.m., wind N.E. and force two, large numbers of *Stomoxys calcitrans* (Linn.) came on board. They did not commence to bite until the afternoon.

Female culicine mosquitoes were seen on board on the evening of October 22, mid-way between Algeria and Spain, wind E.N.E. and force two.

Syrphus (*Epistrophe*) *balteatus* (de G.) were taken at 7 p.m. on August 18, 100 miles W.N.W. of Ushant, wind N.W. and force two, and also at 3.15 p.m. on September 21, 45 miles off the coast of Algeria, in position 36° 40′ N., 00° 25′ W., wind N.E. and force three.

COLIAS CROCEUS ABERRATION.—I took a *Colias croceus* quite close to my house in a clover field last autumn, with the right side *pallida* and left normal. I can't find any mention anywhere of one similar, though Frohawk mentions the occasional appearance of *pallida* forms.—G. H. W. CRUTTWELL; Rowden House, Frome, Somerset.

DANAUS PLEXIPPUS IN HERTS.—During the latter part of August, 1947, I was thrilled to see a Milkweed at close quarters. It was resting on flowers in the small area between the two reservoirs by the canal from Bulbourne to Marsworth. I dropped my cardigan over it, but it escaped me.—J. G. STUBBINGS; 14A, Cauldwell Avenue, Ipswich.

NYMPHALIS ANTIOPA AT ALDERSHOT.—On March 28 this year a Camberwell Beauty was seen in Borley Woods, near Aldershot. It was settled on a piece of iron piping, basking in the sun with its wings wide open.—A. E. BLYTH; 286, High Street, Aldershot, Hants.

NYMPHALIS ANTIOPA IN ESSEX.—A Camberwell Beauty was seen on April 10, 1948, in the extensive woodland known as Ongar Park Wood. It was settled on an oak trunk, and a clear view of it was obtained by a party of nine when it opened its wings to show the cream margin.—Dr. I. H. JENKINS; 20, Monkham's Lane, Woodford Green, Essex.

NYMPHALIS ANTIOPA IN E. KENT.—In a local E. Kent wood, on April 26, 1947, a large black butterfly with white-bordered wings flew over my head and disappeared over the tree tops. While I cannot certify this as a record, I have no doubt in my own mind that this was *Nymphalis antiopa.*—CECIL M. GUMMER; 14, Manor Road, Deal, October 14, 1947.

PAPERS ON MALAYSIAN RHOPALOCERA. VI: *SYMBRENTHIA HIPPOCLA* (HÜBNER, 1838), A SPECIES DISTINCT FROM *S. HIPPOCLUS* (CRAMER, 1779).

By A. Steven Corbet
(British Museum, Natural History).

In a recent publication L. J. Toxopeus and O. Ch. Pock-Steen (1947,* *Ent. Meded. Ned.-Indië*, **7** : 42-43) reported that the assemblage of forms usually grouped under *S. hippoclus* (Cramer) (for example, in Seitz, *Macrolepidoptera of the World*, **9**) comprises two distinct species, which exhibit constant differences in the male genitalia. In Java one of these species, with orange females, frequents the lowlands, while the second, with white females, is montane in habit. The authors believe that the lowland butterfly in Java should be known as *S. hippoclus javanus* Staudinger, and that the oldest name for the second Javanese species is *S. hippocla* (Hübner). Toxopeus and Pock-Steen recongized this latter species from the Sunda and Lesser Sunda Islands, from Palawan and the Celebes, and remarked that in Java, the Lesser Sundas and Palawan the females are white.

I have been able to confirm the above findings of the Dutch authors, except that, according to the material examined, both species may occur at any altitude, although in Malaya only *S. hippoclus* occurs above 2500 ft. In Malaya there is considerable difficulty in separating the two species where they occur together, but, in general, *S. hippocla* has more restricted orange markings on the upperside, and the under-surface is more heavily marked. On the other hand, on islands where only one species is present, it seems hardly possible to identify the species without examination of the male genitalia. The uncus is deeply cleft for the greater part of its length in *S. hippoclus*, but is divided for only a short distance at its apical end in *S. hippocla* (Figs. 1 and 2).

S. hippoclus is widely distributed, ranging from Sikkim to China and Formosa, and through the Malay Archipelago to New Guinea and the Bismarck Archipelago ; the only hiatus in the distribution appeared to be in the Celebes. According to the material in the British Museum, *S. hippocla* is confined to Malaya, the Sunda and Lesser Sunda Islands, Palawan and Bazilan, the Philippines, Celebes and Sula Islands. It is curious that only Hübner's species is represented on the islands off the west coast of Sumatra and on Palawan and Bazilan.

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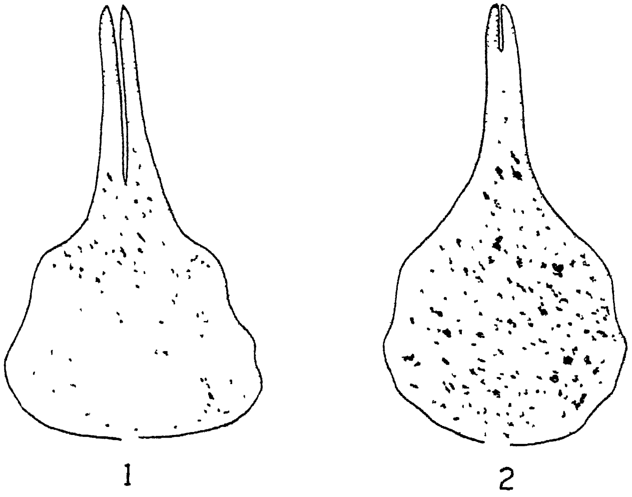
* The issue in question was dated December 16, 1941, and received in August, 1947.



FIGS. 1 and 2.—Ventral view of the uncus of (1) *Symbrenthia hippoclus sumatranus* Fruhstorfer, Sumatra ; (2) *S. hippocla violetta* Hagen, Sumatra.

Unfortunately, the British Museum has only a few of the type-specimens of the forms of the two species under discussion. These are *daruka* Moore, *emas* Corbet, *florida* Swinhoe, *hylaeus* Wallace, *khasiana* Moore, *lilaea* Hewitson, *niasica* Moore and *nigroapicalis* Joicey and Noakes.

From the original descriptions, and from the material in the British Museum, it is deduced that, where the two species occur together, the names for the corresponding subspecies are as shown below. It must be emphasized, however, that, in the absence of the Fruhstorfer types, only tentative conclusions can be reached, and this is especially the case with *lucianus* from Malaya.

	S. hippoclus (Cramer).	**S. hippocla** (Hübner).
Malaya	*lucianus* Fruhstorfer, 1907	**selangorana** subsp. nov.
Sumatra	*sumatrensis* Fruhstorfer, 1912	*violetta* Hagen, 1896
Borneo	*marius* Fruhstorfer, 1904	**viridis** subsp. nov.
Java	*javanus* Staudinger, 1897	*hippocla* (Hübner, 1838)
Bali	*lombokensis* Fruhstorfer, 1900 (= *illustrata*, Fruhstorfer, 1912)	*balinus* Fruhstorfer, 1908
Lombok		*sumbawensis* Fruhstorfer, 1900
Sumbawa	No specimens seen	
Luzon	*thimo* Fruhstorfer, 1907	No specimens seen
Mindoro and Mindanao	*semperi* Moore, February, 1900 (= *philippensis* Fruhstorfer, August, 1900)	*anna* Semper, 1888 (= *galepsus* Fruhstorfer, 1907)
North Celebes	Known only from East Celebes (*platena* Staudinger, 1897, = *sublilaea* Staudinger, 1897)	*clausus* Fruhstorfer, 1904
South Celebes		*confluens* Fruhstorfer, 1897
Sula Islands	No specimens seen	*centho* Fruhstorfer, 1904

It may be mentioned that the oldest name for the Indian subspecies of *S. hippoclus* is *lilaea* (Hewitson, 1864) ("East India" [= Assam]) (= *khasiana* Moore, 1875, *daruka* Moore, 1875), and *florida* Swinhoe, 1903 ("Amboina" [= Obi]) has priority over *obianus* Fruhstorfer, 1904, as the name for the subspecies from Obi. Moore's name *daruka* is often misspelt.

I think that *platena* Staudinger, 1897, described from East Celebes, Minahassa, and treated as a separate species by Fruhstorfer in Seitz, must be regarded as the Celebes representative of *S. hippoclus*. It has the same deeply divided uncus found in the other races of the species, but the distal margin of the valva is studded with spines, unlike any other *hippoclus* form. The butterfly has the dark reddish-brown oblique band on the underside more diffuse than usual, but, otherwise, it shows no remarkable differences from the remaining *S. hippoclus* forms.

Symbrenthia hippocla selangorana subsp. nov.

♂. *Upperside* similar to that of *S. hippoclus lucianus* Fruhstorfer, from Malaya. *Underside* also similar to that of *lucianus*, but usually the ground-colour is rather less uniform and the reddish-brown markings are more intense. In a majority of individuals, on the fore wing, the basal third of space 3 is slightly but distinctly whitened, and the dark submarginal lines in spaces 1b and 2 are more distinct; on the hind wing the pale post-discal lilac purple area is more extensive, more heavily dark dusted, and more prominently marked. Fore wing 20 mm.

Compared with *S. hippocla violetta* Hagen, from Sumatra, the bands on the upperside are broader and paler orange, and, on the underside, the ground-colour is paler, yellower and less uniform.

MALAYA, Perak, Taiping, *ex* Coll. Rothschild, ♂ holotype (B.M. Type No. Rh. 15099). Also examined 5 ♂ of *selangorana* from Malaya at altitudes up to 1500 ft.; 6 ♂ of *S. hippoclus lucianus* Fruhstorfer from Malaya, of which four were taken at Cameron Highlands between 3250 and 5000 ft. As yet, the females cannot be identified with any certainty and no dissections have been made.

Judging by the underside, the specimens figured in Distant, *Rhop. Malay.*, plate xlii, fig. 4, ♂, 5, ♀, are *S. hippoclus lucianus* Fruhstorfer, although the upperside of the male suggests *S. hippocla*.

Symbrenthia hippocla viridis subsp. nov.

♂♀. *Upperside* differs from that of *S. hippoclus marius* Fruhstorfer in that the edges of the orange markings are less diffuse, and that the orange spot in space 2 on the fore wing has its distal edge prolonged as a spur into space 1b. The male has the ground-colour deeper black than in *marius*, and, in the female, the fore wing has an arcuate subapical stripe in place of the elliptical spot found in *marius*. *Underside* ground-colour paler than in *marius*, and the submarginal spot in space 3 on the hind wing is pale bluish-green and continued narrowly into space 4, and not pale purplish blue and, usually, not continued above vein 4 as in *marius*.

Fore wing 17 to 18 mm. in the male and 18 to 19 mm. in the female.

NORTH BORNEO, Mount Kina Balu, 5.viii.1903 (*John Waterstradt*), *ex* Coll. Oberthür, 9 ♂, 6 ♀, including ♂ holotype (B.M. Type No. Rh. 15097) and ♀ allotype (B.M. Type No. Rh. 15098). Also examined 1 ♀ from Borneo (Crowley Bequest).

I am indebted to Major J. N. Eliot for the loan of Malayan and Balinese specimens of Symbrenthia, and to Mr. N. H. Bennett for most of the preparations of male genitalia required for the present investigation.

THE VARIATION OF COLOSTYGIA DIDYMATA L. IN THE OUTER HEBRIDES.—In the Hebrides the variation of this species is great, and has never been satisfactorily worked out. In other Atlantic isles, especially the Faeroes, it is even more wonderful. Of the forms I have seen in the Western Isles, that detected in 1946 on Stuley Island, lying to the east of the Isle of South Uist, is by far the most interesting. It is of a dove-grey colour, with weak transverse markings. I had intended to revisit the island in 1947 to study it, but it was found impossible to make the necessary arrangements.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

VANESSA HUNTERA IN S. WALES.—In the current issue (1947, **2**: 263) of the *Proceedings of the Swansea Scientific and Field Naturalists' Society* there is a report of an American Painted Lady seen at Brandy Bay on August 9, 1946, by the Rev. Basil Viney and Mr. Thomas Smith. Although the observers expressed themselves as satisfied with this identification, it is a pity they were not able to capture the insect.—N. D. R.

FURTHER RECORDS OF COLIAS HYALE IN 1947.—Since the brief summary was published (1947, *Entom.*, **80**: 291) of notes reporting the occurrence of *C. hyale* in 1947, others have come to hand showing the species was present in small numbers outside the extreme south-east. Dr. C. G. M. de Worms reports one on September 21 near St. Olaves in Norfolk, and several more in the same field a few days later. It appeared that these belonged to a brood which had emerged locally. Mr. Gummer saw a male at Salisbury on August 3 and one or two at Blandford, Dorset, the next day. A worn female was netted by Mr. O. A. Alexander at Beaconsfield as late as October 5. In view of Monsieur Berger's recognition of *Colias alfacariensis* as a species distinct from *Colias hyale*, it would be of great interest to learn whether it was taken at all last year, and, if so, to put the facts on record.—N. D. R.

THE GENOTYPE OF *TRICHOPSYLLA* KOLENATI, 1863.

BY G. H. E. HOPKINS, M.A., F.R.E.S.

EWING and Fox (1943, p. 55) describe a genus which they call *Trichopsylla* Kolenati, and of which they assert that the genotype, by designation of Baker (1904, p. 371), is *Pulex penicilliger* Grube. One of the principal characters of *Trichopsylla*, as described by Ewing and Fox, is the presence of a pronotal comb, and they place as synonyms both *Malaraeus* Jordan, 1933, and *Megabothris* Jordan 1933. They also remark that they " recognize the first designation of the type species of *Trichopsylla* by Baker . . . as valid under the International Rules."

Jordan and Rothschild (1920, p. 63) stated that the species that Kolenati (1863, p. 32, pl. 3, fig. 3) described and figured as *Trichopsylla penicilliger* Grube cannot be Grube's species because it has no pronotal comb, and they identified *penicilliger* Kolenati (*nec* Grube) with *Vermipsylla homoeus* (Rothschild), 1907, thus making *Chaetopsylla* a synonym of *Trichopsylla* if their views are correct.

The facts are perfectly clear: the description and both the figures of *Pulex penicilliger* Grube (Grube, 1852, p. 500, pl. 32, figs. 7 and 9) are of fleas with a pronotal comb, whereas Kolenati's definition of *Trichopsylla* includes the absence of any comb (" weder Kopf- noch Rückenctenidien "), and his extremely bad figure also shows the absence of combs. Moreover, Wagner (1898, p. 569, pl. 8, fig. 6) examined the male cotypes of *penicilliger* Grube, which he found to be a species of the group subsequently named *Malaraeus* by Jordan; he also separated (*l.c.*, p. 578, pl. 8, figs. 13, 14) the females in Grube's series as *Ctenopsylla sibirica*, now *Amphipsylla s. sibirica* (Wagner). Both these species possess well-developed pronotal combs, and Wagner's action is a definite restriction of the name *penicilliger* Grube to the males included in Grube's material, i.e., to the *Malaraeus*. Ewing and Fox, therefore, in insisting that *penicilliger* Grube is the genotype of *Trichopsylla* Kolenati, are utterly ignoring Kolenati's definition of the genus, and permitting themselves to be guided solely by his very obviously wrong determination of the material. To assert that a species with a well-developed pronotal comb is the genotype of a genus of which one of the principal characters is the absence of such a comb is sheer nonsense, for no species can be the genotype of a genus to which it does not belong.

Pulex penicilliger Grube is not available as genotype of *Trichopsylla* Kolenati, because it was not included in Kolenati's description of the genus and because it does not fit his diagnosis of *Trichopsylla*.

But it is the genotype of *Trichopsylla* Ewing and Fox, 1943 (*nec* Kolenati, 1863), which is a synonym of *Malaraeus* Jordan, 1933.

Ewing and Fox are correct in asserting that Baker's selection of a genotype for *Trichopsylla* Kolenati is valid, but the species selected by him could not be *Pulex penicilliger* Grube, which Kolenati did not mention, but must be *Trichopsylla penicilliger* "Grube" Kolenati 1863 (*nec* Grube, 1852). *Trichopsylla* Kolenati is, therefore, as stated by Jordan and Rothschild, an earlier name for *Chaetopsylla* Kohaut, 1903, and has nothing to do with *Malaraeus* or *Megabothris*.

REFERENCES.

BAKER, C. F.—A Revision of American Siphonaptera, *Proc. U.S. nat. Mus.*, **27** : 365–469.

EWING, H. E., and FOX, I. (1943), The Fleas of North America, *Misc. Publ U.S. Dept. Agric.*, No. 500; 142 pp.

GRUBE, E. (1852), Parasiten, *Middendorff's sibir. Reise*, **2** (1) : 465–503.

JORDAN, K., and ROTHSCHILD, N. C. (1920), On the Species and Genera of Siphonaptera described by Kolenati, *Ectoparasites*, **1** : 61–64.

KOLENATI, F. A. (1863), Beitrag zur Kenntniss der Phthirio-myiarien, *Horae Soc. ent. ross.*, **2** : 9–109.

WAGNER, J. (1898), Aphanipterologische Studien : III. *Horae Soc. ent. ross.*, **31** : 555–594.

The Zoological Museum,
Tring,
Herts.

MINUCIA LUNARIS IN E. SUSSEX.—On May 21 last I was lucky enough to secure a female *M. lunaris* resting at light here. I understand that this rarity has also been taken elsewhere in E. Sussex during the past month. My specimen is unfortunately slightly rubbed.—M. J. MOWBRAY; 10, Carisbrooke Road, St. Leonards-on-Sea, Sussex.

COLIAS HYALE WINTERING IN N. KENT.—On May 21, 1948, my brother (J. E. Owen) caught two freshly hatched male *C. hyale* and saw three others in a lucerne field in N. Kent. We paid another visit to the same field on May 23, and found two newly emerged males (one with wings still limp) resting on dandelions. Had the weather been favourable we would probably have seen more on that date, but it was dull with occasional drizzle. Last winter was particularly dry and quite mild in this part of Kent, thus giving the larvae resulting from autumn butterflies a chance to survive. The lucerne in this field was cut early last year and was allowed to grow up again, and above all was not ploughed up this year. No other migrants have been seen in this area so far this year—not even a single *Plusia gamma*. Considering the facts one can definitely say that these butterflies are not migrants, but doubtless British-bred specimens. This species was quite common in lucerne fields last year in N. Kent, together with large numbers of *C. croceus*. We hope to make fuller observations in the next few weeks, and again in August if another brood appears.—D. F. OWEN; 3, Lockmead Road, Lewisham, S.E. 13.

MICROBOLBOS TESTACEUS, A NEW GENUS AND SPECIES OF PONERINE ANT.

By Horace Donisthorpe, F.Z.S., F.R.E.S.

Microbolbos gen. n.

The two posterior pairs of tibiae furnished with two spurs; mandibles of ordinary form, no marked angle between the masticatory border and the basal border; anterior border of clypeus not toothed, but triangularly pointed, covering the mouths parts; claws simple; eyes placed in front of the middle of the head; cheeks without carinae; meso-epinotal suture distinct; frontal carinae soldered together at apex and extending in a point, or single carina over the clypeus, and furnished at base of lateral border with a very small lobe only slightly covering the insertion of the antennae; antennae 12-jointed. Maxillary palpi 2-jointed; labial palpi 4-jointed.

Genotype: *Microbolbos testaceus* sp. n.

Microbolbos testaceus sp. n.

Reddish testaceous, clothed with very short rather sparse decumbent yellow hairs. With head bent, superficially very like an *Aenictus*. *Head* longer than broad, sides subparallel, posterior angles rounded, posterior border slightly excised in middle; *mandibles* rather long, narrow, shallowly and sparingly punctured, no angle between basal border and masticatory border, the latter armed with 3 teeth, the apical one longer and pointed, the other two not well marked; *clypeus* convex on disc, triangular, pointed at apex and extending over the mouth parts; *frontal carinae* narrow, with a small lobe at base of lateral border scarcely covering the insertion of the antennae; soldered together at apex; a single carina with a sharp point extending over the clypeus; *eyes* moderate, flat, round, consisting of a few ommatidia, situated in front of centre of sides of head; *antennae* 12-jointed, *scape* narrow, extending beyond posterior border of head, inner border almost straight, outer border curved a little, broadest before apex, *funiculus* pubescent, gradually thickened to apex, joints 1–5 longer than broad, 6th as broad as long, 7–10 transverse, last joint slightly longer than the two preceding taken together. *Thorax* longer than broad, slightly constricted in middle, broadest before base of pronotum; *pronotum* simple, convex, narrowed to apex, forming a short neck, side borders rounded and margined; *pro-mesonotal suture* deep, margined; *mesonotum* small, flat, narrow, transverse, rounded anteriorly, and, at sides, straight posteriorly; *meso-epinotal suture* well marked; *epinotum* long, broadest at base, *dorsal surface* longer than declivity, *declivity* transversely striate, slightly concave in middle; *node* to *petiole* large, high, flat posteriorly, slightly rounded anteriorly, upper surface forming a large round blunt point; *gaster* rather long, narrow, curved, sides narrowed to base, truncate anteriorly, strangulation between post-petiole and following segment not very marked; *post petiole* about as long as following segment. *Sting* well developed. *Legs* fairly long. *Length* 4–4·5 mm.

Described from eight workers from soil at root of cacao tree. No. F.463. Gold Coast. E. P. Tafo, vii.1945 (*Strickland*). Holotype in the British Museum (Natural History).

NOTES AND OBSERVATIONS.

COLIAS HYALE IN JUNE.—I was at Bishops Stortford, Hertfordshire, on June 13 and at 3 p.m. observed a *C. hyale*. I'm afraid I pursued it without success for a considerable distance. It was flying roughly S.W.–N.E. I am certain identification was correct, as during the chase I was frequently very near it. This was over high ground about a mile and a half west of the town.—G. E. SCHMOLLE: 35, Parke Road, Barnes, S.W. 13, June 15, 1948.

COLIAS CROCEUS IN APRIL.—On April 13, 1948, between 4 o'clock and 4.45 p.m. (B.S.T.) I saw on the cliffs at Exmouth ten *C. croceus*, all in perfect condition, and certainly not looking as if they had just arrived from a long overseas journey. The day had been very sunny and warm, but there had been a southerly breeze all the morning. The cliffs at the point where these butterflies were seen are sheltered from the north and east, and lucerne, trefoil and clovers grow there freely.—S. D. GIBBARD; 9, Imperial Road, Exmouth, Devon.

COLIAS CROCEUS IN APRIL.—In view of the 1947 abundance of the Clouded Yellow, I think it of interest to report that at Ventnor, Isle of Wight, on April 18, a very warm day, Commander Harper and I were surprised to see two of this species on the undercliff. Both eluded capture, but we got close enough to one of them to note that it was rather a worn male, doubtless an early immigrant.—C. G. M. DE WORMS.

EARLY APPEARANCE OF COLIAS CROCEUS.—On April 26, while I was taking my sandwich lunch in a sheltered valley on the outskirts of Plymouth I watched for some time a single specimen of *C. croceus* as it quartered a sunny bank. The butterfly was a male in good condition, and it would be interesting to know whether it was a home-bred specimen that had survived the winter in some form or, more probably, a particularly early migrant.—C. G. LIPSCOMB (Lt.-Col.); Orchard Lodge, Rowford, Taunton.

[It is not possible to say whether these early *C. croceus* are immigrants or not. In view of the mildness of the winter, however, and the absence of any strong evidence of immigration, it is quite possible that they are survivals from 1947.—ED.]

PAPILIO MACHAON AT LINTON, CAMBS.—On August 13, at the Village College, Linton, Cambs, I saw a specimen of *Papilio machaon*.

This is twenty miles or more from Wicken and far from any typical Swallowtail country. I was not able to ascertain whether the insect was the British race or the continental.—J. E. H. BLACKIE; 17, Spinney Road, Northenden, Manchester.

COURTSHIP OF AGLAIS URTICAE.—In the spring of 1946 I saw two small Tortoiseshells near York on a railway embankment flying around together and settling together. Each time they settled one butterfly, which I took to be the male, walked up behind the other and with its antennae appeared to tickle the antennae of the front one from the inside. The front butterfly held its antennae almost vertical, but apart, while the hind one held its antennae stretched forward. Both held their wings outstretched sideways and horizontal. I mention this in connection with the note in the January number of the *Entomologist* about the "drumming" of *Colias croceus*.—JOHN MOUNSEY; Bootham School, Yorks.

MINUCIA LUNARIS IN E. SUSSEX.—On the night of May 13, 1948, I had been running a powerful light for the purpose of attracting moths. It was very foggy and warm with little wind. At about 10.30 B.S.T., as only the usual run of insects had turned up, I switched off the light. Almost at once I observed a fair-sized moth. You may well imagine my astonishment when I recognized *lunaris*. There is, I think, little doubt that the insect had been attracted by the powerful light, but it had not settled on the sheet, though probably on foliage nearby (poplar). The main light being switched off it had been attracted by a lesser light. The moth was in perfect condition and grey-fawn in colour (not the pinky-brown of South's illustration). Fortunately it remained quiet after boxing, and the following morning I was able to take several photographs of it.—WALTER J. C. MURRAY; Murrays School, Horam, East Sussex.

[A photograph appeared in *The Times*.—ED.]

FURTHER RECORDS OF RHODOMETRA SACRARIA.—Since reports received were last summarized four more have come to hand. D. G. Marsh took a single male in a stubblefield at Lydden, near Dover, Kent, on August 31, 1947. Another was taken by Humphrey Stevens, of Reddisham, at Wickham Market, Suffolk, on September 17. P. F. Harris took a male in good condition at light on November 1 between Whitstable and Blean, in 1945. And at Paignton P. P. Milman flushed two males on November 11, 1947, on a piece of waste land in the railway goods yard.—N. D. R.

CALOMOTROPHA PALUDELLA IN ESSEX AND KENT.—Whilst my son and I were engaged in our search for *S. gigantellus* last year we found *C. paludella* common in one very restricted locality. Possibly owing to the hot summer the moth was already worn when we found it on July 12. When I used to take it in the Broads it was usually in perfect condition at the end of July, by which time it had disappeared in the Essex locality. I also found a male *paludella* amongst some Whitstable insects submitted for identification by Mr. P. F. Harris, who writes that a male came to light on 9.vii.45, five more (all males) were taken drinking round a pond on 25.vii.45, and a male came to light on 21.viii.47. So far as I can ascertain *paludella* has not been recorded for Essex or Kent before. I have found records for Norfolk, Suffolk, Cambridge, Sussex, the Isle of Wight and Dorset. The Broadland specimens are much more interesting than those I have seen from Essex, Kent, Sussex and the Isle of Wight. I have seen about 50 from Barton Broad and these range from brilliant silvery white to deep leaden grey, whereas those from the other localities that have come under my notice, which must in all have run into hundreds, have only varied from a yellowish grey to a muddy-looking darker grey.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

THE ABUNDANCE OF DRAGONFLIES OF THE GENUS SYMPETRUM IN THE OUTER HEBRIDES IN 1947.—Whilst we were on the Isles of Coll and Rhum in 1947 it was obvious that the two dragonflies *Sympetrum danae* Sulzer and *S. striolatum nigrofemur* Selys were more abundant than usual, but that remark fails to describe the abundance of the same two species on the Isles of Benbecula, Ronay and Grimsay. Around the Lochs na Smalaig, Dun Mhurchaidh and Olivat pairs attached *per collum* flew everywhere in prodigious numbers, but what was equally remarkable, the species occurred on Rueval and on moorlands as far from water as one can get on Benbecula.—J. W. HESLOP HARRISON; Dept. of Agriculture, King's College, Newcastle-upon-Tyne.

A STRANGE HABITAT FOR DIATARAXIA OLERACEA L.—On August 25, whilst we were exploring the various lochans lying between Loch Hermidale and the sea loch Uskavagh on the Isle of Benbecula, I noticed an enormous caterpillar on the leaves of the white water lily (*Nymphaea alba*) floating in one of them. At first the huge size of the larva puzzled me, but soon I recognized it as representing the brown form of *D. oleracea*. Further search revealed that both of the dimorphic colour forms of this larva were feeding in some numbers in the open sunshine both on the water lily and bog bean. Moreover, they were moving freely from leaf to leaf and from plant to plant. As the plants were growing in fairly deep water, it was with some difficulty that we collected a supply for experimental purposes. Several were placed in the water, and so long as the distances were not more than a foot or so they managed to regain their food-plants. Attempts to " swim " distances greater than that ended, in general, disastrously. However, the problem concerning their mode of pupation was never solved !—J. W. HESLOP HARRISON; Dept. of Agriculture, King's College, Newcastle-upon-Tyne.

PLUTELLA ANNULATELLA CURTIS IN THE ISLE OF TIREE AND ITS ORIGIN.—Meyrick records this species from Devon, Dorset, Denbigh and York to the Orkneys. It seems, therefore, not to have been placed on record for the Hebrides. On June 25, whilst I was examining the sea gullies which bite into Ceann a'Mhara, Isle of Tiree, I was attracted by the condition of the scurvy grass (*Cochlearia officinalis*) growing at the seaward end of one of them; the plants were simply in shreds. Examination speedily indicated that this was due to the ravages of a great number of larvae of *P. annulatella*. These, at times, are so exposed to the waves that they must lead a very precarious life. As Ceann a'Mhara is one of the few known relict stations on Tiree, and was not submerged by the eustatic rise in sea level which marked the closing stages of the Great Ice Age, it seems clear that, so far as Tiree is concerned, the species is of Pleistocene origin.—J. W. HESLOP HARRISON; Dept. of Agriculture, King's College, Newcastle-upon-Tyne.

SOME HABITS OF PAPILIO MACHAON AND IPHICLIDES PODALIRIUS.—In the spring of 1947 it was noted that *I. podalirius* was never seen to settle on a red or scarlet flower, although it visited all the other colours in the garden described in *Entom.*, **81** : 64. In the spring of 1948 this neglect of red was repeated. On the other hand, while in 1947 *P. machaon* was too scarce to provide opportunity for observation, in 1948 it was common, being first seen February 29 and outnumbering *podalirius*, first seen March 10, and it has been seen feeding on scarlet geranium, dark purple and dark blue flag iris, yellow crucifers, mauve valerian, which it preferred to similarly coloured pelargonium, and mauve lemon-scented geranium, which it frequented without passing on to the near-by and very similarly coloured mesembryanthemum. This last plant was also somewhat neglected last year, although why this should be is puzzling, as once this year a *podalirius* returning after one of its circling joy-flights overshot the geranium and landed on the mesembryanthemum, which it tested, found to its liking and thereafter frequented for some time.

In this matter of joy-flights *machaon* differs from *podalirius* in that its flights are carried out close to the ground instead of between 10 and 20 feet above it. Perhaps these contrasting habits are in some way correlated to the heights of the food-plants, low-growing vegetation, such as the plentiful wild carrot, *Daucus*, in the first case, and shrubs or small trees, such as the locally common blackthorn, *Prunus*, in the second. Such low circling flights were repeated by *machaon* on a number of days, being often accompanied by sun-basking. Thus on May 2 one settled within an area of less than four square yards four times on low-growing greenery and three times on the bare earth or flattish stones of a path. It was noticeable that the butterfly managed its flight so that it always settled in the desired position, facing away from the sun, whereas *Pararge megera* more often than not settles in any position and then scrambles round to the desired stance. Sun-basking *megera* only open their wings moderately widely, but *machaon* open theirs to slightly over 180 degrees when the situation permits. *Podalirius* is approachable enough when feeding, but seems to be a wary creature and has its favourite perches on high bushes and small trees. One day one repeatedly settled, always within two or three feet of the same spot, at a height of about 12 ft., on the creeping *Senecio* which drapes the quarry wall (*ibid.*). Wishing to get a closer view a lady cautiously and quietly approached the settled butterfly, but when she came within a few yards it darted away on a longer and more far-ranging flight than ordinary, and when it returned it settled five feet above its previous perches. When the lady moved away it once more took to flight, but soon returned to re-occupy the old lower site.—N. ELIOT (Lt.-Col.): Cavalaire, Var, France.

RECENT LITERATURE.

Gall Midges of Economic Importance. By H. F. BARNES. Vol. III: *Fruit.* London: Crosby Lockwood & Son, Ltd., 1948. 184 pp. 9 pls. 15*s.*

This is the third volume of Dr. Barnes' series, the first two volumes of which were published in 1946 and reviewed in this journal, **79** : 224

Like the previous volumes, and in fact the series as a whole, the book is intended primarily for the use of those people actually concerned in the growing of crops, and is not written for the use of the entomologist who wishes to identify individual midges. Hence the arrangement is not according to the natural classification of either midges or plants, but is alphabetical according to the English name of the plant attacked. As in the other volumes, crops of the whole world are dealt with and not just those of the British Isles. Under each species of midge considered is a fairly detailed account of its life-history and natural enemies and a description of the gall; there are also photographs of some of the galls. Few descriptions are given of the adult insects, though references are given to the original descriptions. For many of the species such control measures as have been tried out are described. The bibliography is excellent, running into 467 references, and should prove most helpful to future workers; the most important references to a species are also quoted under that species.

Dr. Barnes has set out to bring together all the available information about and references to the midges attacking fruit crops, and in this he has been most successful. P. F.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March* 24, 1948.—The President, Col. P. A. Cardew, in the Chair. *Exhibits:* Dr. H. B. D. Kettlewell, young larvae of *Apatura iris* after hibernation, reared from eggs found on the upperside of leaves of sallow in Sussex; Mr. W. E. Busbridge, an aberration of *Angeronia prunaria* with the wings entirely chocolate in colour, the only trace of orange being on the body, from Elham, Kent; Mr. T. R. Eagles, *Cassida hemisphaerica* Herbst (Col.), taken at Bayford, Herts, September, 1947. It was reported that *Nymphalis polychloros* had been seen between March 6 and 15 at Angmering (Sussex), Sevenoaks and

Sidcup (Kent), Boxhill and Isle of Wight. The President extended a warm welcome to Mr. B. J. Lempke, who had just arrived from Holland, and who read a paper on The Migrating Macrolepidoptera of Holland in Comparison with those of Great Britain.

April 14, 1948.—The President announced the bequest to the Society by the late Canon G. Wheeler of the following works by Charles Oberthur: *Études de Lépidoptérologie Comparée*, Fascicules 1–16, and *Contributions à l'Étude des Grands Lépidoptéres d'Australie. Exhibits:* Mr. T. G. Howarth, on behalf of Mr. F. T. Vallins, the Canadian beetle *Buprestis aurulenta* L. (Col.), found in March, 1948, in a house at Woodford, Essex, where another specimen had been found in June, 1947, and doubtless emerged from Canadian timber used when the house was built two years ago; Mr. A. D. Blaxhill, *Polygonia c-album* var. *suffusa* Frhk. and *Pieris napi* var. *impunctata* Röb. from Colchester, Essex, and a reared specimen of the form of *Colias hyale* regarded by some as a separate species, *C. alfacariensis* Ribbe, from Tillingbourne, Essex; Mr. E. H. Wild, a stem of *Viburnum lantana* which had been killed by the attack of nine larvae of *Aegeria andreniformis* in a length of two feet; Mr. L. G. Payne, *Chrysomela cerealis* taken on wild thyme in 1893; Mr. H. W. Forster, *Agonum sexpunctatum* L. (Col.) and *Lamprinodes saginatus* Gran. (Col.), both taken at the Oxshott Field Meeting on April 4, 1948; Mr. F. D. Buck, larvae of *Endomychus coccineus* (Col.) taken at High Beach, Epping Forest, Essex, on dry black fungus, March 21, 1948. *Communications:* Mr. E. H. Wild had seen *Macroglossum stellatarum* commonly each day from March 22 to 30 on the cliffs of the Isle of Wight. *Nymphalis polychloros* L. (Lep., Nymphalidae) had at the same time been fairly common at Bembridge.—T. R. EAGLES, *Editor*, 32, Abbey Road, Enfield, Middlesex, April 19, 1948.

AMATEUR ENTOMOLOGISTS' SOCIETY.—On March 20, 1948, the Annual Exhibition and General Meeting were held at the Buckingham Gate Schools, Victoria, London, S.W. 1. Over three hundred people attended. Most Orders of Insects were represented in the exhibits, but Lepidoptera was predominant, as usual. Amongst the exhibits were two interesting cases of varieties of Lepidoptera collected and bred by R. W. and N. I. Watson, and varieties of *Colias croceus* exhibited by J. R. Brunsden. Talent in the younger members was represented by an enterprising effort by D. F. Owen showing insects caught and bred during 1947. Apparatus exhibits were numerous. Several members revealed their artistic abilities in paintings and drawings of entomological interest. Photographs taken by various members also figured, and the apparatus used in their production. To this A. L. Shuffrey added a short talk and demonstration with some of his apparatus. Other talks were given by E. E. Syms (Dragonflies), A. J. A. Woodcock (Water beetles), B. O. C. Gardiner (Micros) and demonstrations by B. L. J. Byerley (Carding beetles) and J. D. Chynoweth (setting).

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NEW VARIETIES OF *ARGYNNIS CYDIPPE* L. AND *LYCAENA PHLAEAS* L.

BY A. L. GOODSON.

(Zoological Museum, Tring.)

IN the Rothschild collection at the Tring Museum are two albinistic specimens of *Argynnis cydippe*, both males, identical and apparently unnamed.

I describe this form as—

Argynnis cydippe ab. **albomaculata** ab. nov.

♂. Ground-colour paler and more orange than typical, the usual black markings completely lacking the pigment melanin, giving these the appearance of dull silver.

♂. *Holotype.*—Rhamnor Enclosure, New Forest, July, 1901, *C. Gulliver.* (Figured by Frohawk in *Varieties of British Butterflies*, Pl. 15, figs. 1 and 2.)

♂. *Paratype.*—Penny Pat Wood, Kent, July 7, 1888. (Figured by Frohawk in *Nat. Hist. Brit. Butt.*, Pl. 13, fig. 17.)

This form is similar in appearance to *Argynnis aglaia* ab. *albomaculata* Rebel (Berge's *Schmetterlingsbuch*, 1910, p. 33), of which ab. *molybdena* Newnham (*Entom.* **50**:207) is a synonym.

THE IRISH FORM OF *Lycaena phlaeas*.

Comparison of the series of Irish and English *Lycaena phlaeas* in the Tring Museum showed such a constant difference that I came to the conclusion that the Irish race was probably distinct. However, since the series of Irish examples numbered only 45 (spring and summer broods) and were from Co. Kerry only, I hesitated to draw any definite conclusion.

I am indebted to Mr. E. S. A. Baynes for enabling me to proceed further by examining Mr. Dudley Westropp's series of about 160 English and 297 Irish specimens from the following localities: Co. Cork (258), Co. Kildare (18), Co. Dublin (10), Co. Galway (10), Belfast (1), and he agrees that the differences are constant.

I therefore describe the race as—

Lycaena phlaeas hibernica subsp. nov.

♂♀. *Upperside.*—Differs in the broader copper band of the hind wings, which, however, varies to a certain extent, some specimens being comparatively narrow. This is also so in English specimens, but it is safe to say that the narrowest English specimens are narrower than the narrowest Irish, whilst the broadest Irish are broader than any English.

Underside.—The main difference is found here. Ground-colour invariably greyer than English examples, which, by comparison, are of various shades of brown. The red marginal band of the hind wings much more conspicuous and of a brighter hue, always distinct, even brilliant in Irish specimens, whilst in English ones usually narrow, rather dull or obscure. A series of undersides, Irish and English, shows a marked difference in this respect, enhanced by the grey ground of the Irish examples.

♂. *Holotype.*—Co. Kerry, May 23–June 17, 1920. *L. A. E. Sabine* (Rothschild collection).

♀. *Allotype.*—Co. Kerry, May 23–June 17, 1920. *L. A. E. Sabine* (Rothschild collection).

♂. *Paratypes.*—Co. Kildare, August 11, 1947; Co. Cork, August, 1931; Co. Cork, September, 1931; Roundstone, Co. Galway, August 20, 1947. *Dudley Westropp.*

♀. *Paratypes.*—Co. Kerry, August 24–September 7, 1920 (Rothschild Collection). Co. Cork, August, 1927. *Dudley Westropp.*

These specimens are in the Rothschild-Cockayne-Kettlewell collection of British Lepidoptera.

A GYNANDROUS HYGROCHROA SYRINGARIA.—Some time about six weeks ago I was searching in our local woods when I found one single larva of *H. syringaria.* This duly fed up and pupated, and last week emerged, proving to be a most striking looking insect. The coloration of the left wings is of the light shade associated with the female, whilst the right-hand wings are bright brick red like the male. A certain amount of luck and good fortune is always the lot of the amateur. I suppose in the woods where I was searching there might possibly have been dozens and dozens of larvae of this particular species, yet I managed to find possibly the only one that has turned out to be more or less a freak.—F. W. BYERS; 59, Gurney Court Road, St. Albans, Herts, June 19, 1948.

SOME EARLY RECORDS OF LEPIDOPTERA.—The present year has been marked by the early appearance of so many species of Lepidoptera that to supply records is to bring coals to Newcastle. It is possible, however, that the following short list may be not without interest: Feb. 13, *Gymnoscelis pumilata,* Folkestone; April 27, *Hadena suasa,* Folkestone; May 6, *Vanessa atalanta,* near Folkestone; May 10, *Lysandra bellargus,* in fair numbers, Folkestone Downs; May 15, *Procris statices,* Sussex; May 16, pupa of *Aglais urticae,* Sussex, from which an imago emerged June 1; *Plusia gamma,* Sussex; *Colias croceus,* near Folkestone; May 19, *Colias hyale,* Folkestone Downs (or possibly the new species); May 20, *Herse convolvuli,* Folkestone.—A. M. MORLEY; 9, Radnor Park West, Folkestone, June 2, 1948.

APLASTA ONONARIA IN 1947.

BY A. M. MORLEY, O.B.E., M.A., F.R.E.S.

IN a rather remarkable year this species distinguished itself in four ways. It successfully negotiated one of the worst winters on record; it appeared in greater numbers than ever before; it turned up in localities from which it had not previously been recorded; and, as in 1945, it produced a second brood.

The winter of 1946–47, with its alternations of heavy rain and extreme cold, might well have been expected to prove fatal to so precariously established an immigrant. Yet, to judge from subsequent events, its effect was beneficial rather than the reverse. The explanation may lie in the fact that the month of May, the period in which the larvae feed up after hibernation, was exceptionally favourable to rapid growth, being dry and sunny. At any rate they prospered, and by the 24th of the month were nearly full fed, which suggested that the moths would emerge at an earlier date than usual.

Actually the first moths were noted, not in the Folkestone Warren, but by Mr. Demuth in another part of the coast of Kent. Here some 20 were seen on June 20, and at least 40 on the following day, and the insects continued in flight until the beginning of July. To judge by their numbers, the area over which they were spread, and the depth of their colour, these did not represent a new colony but one of some years' standing. During the war practically the whole coast of Kent was inaccessible to civilians, and this fact would have prevented the moth from being discovered, and given it a reasonably long period in which to develop without being disturbed.

The colony in the Warren likewise flourished, and on June 23 30 moths were seen in a limited area.

This early emergence naturally raised hopes of a second brood, though the fact that larvae in captivity were already beginning to hibernate before the end of July was discouraging. However, a second emergence did take place, and on a considerable scale. In both the Warren and the new locality it seems to have begun at about August 18, and to have lasted till the end of the month, and this brood was rather more numerous than the first.

It appears to be a characteristic of the second brood that it is to some extent migratory. Not only were individuals noted in parts of the Warren where no colony is known to exist, but a number turned up inland at a considerable distance from any likely breeding-ground. The origin of the two reported from

Westerham and Tilgate Forest respectively is, of course, a matter of conjecture.

I take this opportunity of expressing my thanks to the several entomologists who were kind enough to give me information on the subject of *ononaria*. Altogether I estimate that at least 300 of the moths were seen (far more than were actually taken), and this is not likely to be the whole of the story.

9, Radnor Park West,
Folkestone;
June 2, 1948.

GORTYNA FLAVAGO SCHIFF. AND POTATOES.—The larva of this species has been found in potato haulms. But the moth is on the wing in the autumn and lays its eggs and dies before winter. There are no potatoes in the ground in winter. Where, then, are the eggs laid?—P. B. M. ALLAN; 4, Windhill, Bishop's Stortford, Herts.

HAPALOTIS VENUSTULA IN SURREY.—I have been informed that in 1947 three casual specimens of *Hapalotis venustula* were taken in the south of England outside its known limited habitats. On June 24 I netted a fine male in the Haslemere area of Surrey, flying over waste ground at early dusk. Possibly the species is migratory, and came to the south of England from the Continent last summer. Its small size makes it easily overlooked. But if so, it is strange that in the past the species seems to have been taken in three restricted localities only in Essex and Sussex.—R. M. MERE; Pembroke Lodge, Steepways, Hindhead, Surrey,

EARLY BUTTERFLIES AT LLANDUDNO.—On March 26 there were several specimens of *Pieris rapae* on the wing in Llandudno during the morning, and on paying a visit to a sheltered valley near Eglwysbach during the afternoon of the same day I observed the following butterflies: *Aglais urticae, Polygonia c-album, Vanessa io, V. atalanta, Cyaniris argiolus, P. rapae, P. napi, P. brassicae* and *Pararge aegeria*. I have never before observed *P. napi* or *P. brassicae* in March in this district. A visit to the same locality on April 26 revealed the following species besides those quoted above which were still flying: *Euchloë cardamines* (both sexes), *Pararge megera* (ditto), *Lycaena phloeas, Polyommatus icarus, Argynnis euphrosyne* (very common), *A. selene* (three), *Ochlodes venata* and *Erynnis tages*. The moths *Euclidia mi, E. glyphica* and *Pseudopanthera macularia* were all common. I also observed on the same day at Bryn Pydew *L. astrarche* and *Nymphalis polychloros*. This latter insect seems to be getting less rare, as I have observed one or two every spring since 1944, with the exception of 1947. I observed it locally in September, 1945, and I saw a fine one sunning itself on Brixton Town Hall, London, October 26, 1946! There can be no doubt at all regarding the identity of the species, as I got within a yard of it. Finally, I observed a male *Colias croceus* at Eglwysbach on May 16.—G. ELLIS, F.R.E.S., F.R.A.S.; "Blodfryn," Bryn Pydew, Llandudno Junction, Caerns.

ON THE RACE OF *EREBIA EPIPHRON* INDIGENOUS IN THE BRITISH ISLES.

By B. C. S. Warren, F.R.E.S.

The true characters of a race of butterflies are seldom revealed by a small number of specimens, unless the species chances to be an exceptionally stable one. Yet it often happens that the systematic worker is compelled by circumstances to make do with an inadequate material. This happened in my own case when I was working on *E. epiphron* for my Monograph of the genus. I was living abroad and did not succeed in getting any English or Scotch specimens in time to illustrate, and it has since become evident that the few I did get were picked examples, well-marked and typical of Haworth's description of his *mnemon*. As it happens, this gave quite a misleading idea of the racial characters of the English subspecies. My treatment of the variety *mnemon* requires, therefore, considerable alteration; especially as the matter has been further complicated by the publication of a name for specimens from Scotland in 1943.

The whole question has been confused from the beginning. Haworth's description was said to have been taken from specimens obtained by Stoddart from Ambleside, but there can be no doubt he had also seen Scotch examples for not only does he give Scotland as the habitat but the strongly-marked form he describes, with four black spots on the fore wings and two on the hind, is of much more frequent occurrence in Scotland than England. This accounts for the fact that I noted (Monog. of Gn. *Erebia*, p. 105) that English writers so often referred to their specimens as "*cassiope* Fab." In this they were, undoubtedly, correct; for only a very low proportion of English specimens attain the more distinct type of markings. It must therefore be remembered that the characters I mention (l.c.) as distinguishing *mnemon*, while correct, only apply to occasional examples in England—aberrations; the race as a whole being, quite unmistakably, the poorly-marked subsp. *aetherius* (= *cassiope* Fab.). This fact restricts Haworth's *mnemon* to the more strongly-marked variety occurring as a form in Scotland; but it does not constitute a subspecies, for though *mnemon* is the most frequent type in its northern habitats, it by no means excludes the poorer-marked one. If we were to maintain that the name must apply to Stoddart's specimens as a whole, i.e. the Ambleside race, then it would merely fall as a synonym of *aetherius*. Such an action, however, would not be in accord with Haworth's description.

When considering the characters of subsp. *aetherius* it is important to note that the extent of the rusty coloration that may be present on the upper side varies in every conceivable manner. On the whole it most often appears as a rusty band, variable in width, and broken by the dark ground-colour spreading along the nervures on the fore wings, and as a few widely-separated spots on the hind wings. The extent of the ground-colour on the nervures of the fore wings is also variable, and consequently the rusty band may be divided into roundish, oval or rectangular spots, of variable sizes. Occasionally the band is fully joined up, and, more rarely, greatly increased in width. Not infrequently it is more or less lost, as in f. *nelamus*; but even in localities where the latter predominates specimens, especially females, with a broad and continuous band can be found. The number of black spots that can be present ranges from one to eight (four on each wing), but completely unspotted examples are by no means rare. They are more often lost on the hind wings than the fore.

Among English and Scotch specimens I have seen a few examples of the dark, alpine ab. *nelamus* Boisd. This is of great interest, for it will be recalled that the only Irish examples which we know belong to this dark form. This fact becomes less surprising now we have established that subsp. *aetherius* is the race of the British Isles, for ab. or form *nelamus* is dependant on the latter. The subsp. *aetherius* extends over the greater part of the European Alps. I have seen hundreds of specimens, from the S. Styrian Alps and the Hohe Tauern in the east; the Salzburg, Bavarian and Algauer Alps in the north; the Dolomites, Rhaetian, Lepontine and Pennine Alps in the central districts; the French Alps and finally, the Roman Apennines in the south. In all of these districts, except the last, ab. *nelamus* occurs; and it may even occur in the Roman Apennines, but I have not as yet seen specimens of it from those mountains. Where *nelamus* occurs in a racial manner, as it does in the Dolomites and Rhaetian Alps, it is invariably a very high-level form, most constant between 6000 and 9000 ft. Where it occurs as an aberration is most normally at the lowest levels that subsp. *aetherius* frequents. It will, therefore, seem strange to some that *nelamus* should exist as a form only a few hundred feet above sea level in western Ireland. Of course, it is not certain that the three specimens of supposed Irish origin really represent the racial features of the locality; they may only have been aberrations. But it is by no means impossible that *nelamus* has attained a racial predominance in this region, for in a certain degree latitude always counterbalances altitude. The alpine districts that are the continental habitat of *aetherius* lie, approximately, between 45° and 48° N. lat., while the supposed locality of the Irish specimens would be about 55° N. lat. Such a difference would probably be sufficient to balance the altitude.

In describing the *epiphron* races I made us of the terms " northern " and " southern "; applying the former to the heavily-spotted, typical race of the Harz Mountains and those other races displaying a similar type of marking, and the latter to the poorly-marked race of the Alps. These terms are unsatisfactory and confusing; for though on the Continent the typical race and its nearest allies occupy districts far to the north of the Alps—the *aetherius* zone—they also extend far to the east, and even south of it in the Balkans. Now that we know that *aetherius* in the British Isles attains the most northerly latitude for the species, the only reason for retaining such terms is abolished.

The subsp. *mackeri* is the race with closest affinity to subsp. *aetherius*. Form *mnemon* differs from subsp. *mackeri* as I described (l.c.), but it is only in exceptionally heavily marked specimens that the markings of the underside are as similar to those of the latter as I was led to suppose. Even in such specimens, when the coloured rings on the under side of the hind wings are practically as well developed as in *mackeri*, the much smaller size of the black spots on the upper side give the specimen a totally different appearance. In *mackeri* these spots as well as being more pronounced, are all, approximately, of equal dimensions; this is never the case in f. *mnemon*. Recognition of these characters of f. *mnemon* shows that among continental *aetherius* aberrations with four black spots on the fore wings and three or four on the hind, are indistinguishable from *mnemon*. Such specimens occur wherever *aetherius* flies, but I do not know—as yet—of any locality in the Alps where *mnemon* occurs as a form. As I noted in my description of *aetherius* (l.c., p. 107), the chief characteristic of the spotting is the uncertain number that may be present and their variable sizes. It is scarcely possible to say what combination of spots is the most frequent; perhaps two on the fore wings (the apical ones) and a tiny point on the hind. A third at the lower angle of the fore wings is also frequently present.

In the features of the underside subsp. *mackeri* stands in an intermediate position between typical subsp. *epiphron* and subsp. *aetherius*; its geographical range shows a closer connection with the latter. Both *mackeri* and *aetherius* must be endowed with an irresistible urge to wander, and have spread their range over many hundreds of miles and innumerable mountain ranges, and now occur in unchanged form in widely isolated localities, which is in marked contrast to the other races of the species, all of which are restricted to very limited areas.

Subsp. *mackeri* ranges, in unchanged appearance, across France from the Vosges to the Eastern Pyrenees, having left a colony in the mountains of the Auvergne in passing. An obvious offshoot has developed striking characters far to the west along the Pyrenees (*pyrenaica*). Subsp. *aetherius* has extended east of the *mackeri* region to occupy almost all suitable areas in the Alps. One other subspecies exists within the *aetherius* region; a large, but not brilliantly-marked race in the Maritime Alps (*cydamus*). This race is clearly an offshoot of *aetherius*, for it shows some tendency to spread; a form of it is found in the Etruscan Apennines. The large size of this race is, doubtless, a local specialization; for it is not entirely constant and its more southern offshoot is decidedly smaller. The markings also have more resemblance to those of the *mackeri-aetherius* type than to the other subspecies. Compared with the latter, both *mackeri* and *aetherius* seem to have sacrificed size and markings in the effort to extend their range and adapt themselves to new environment; but the reduction has been carried to the greatest extremes in *aetherius*, which succeeded in covering the greatest area.

To the north and east of the *mackeri* and *aetherius* region, completely beyond the limits of the Alps, lie the chain of large and very finely-marked races each of which is confined to a very restricted area, the obvious outcome of a sedentary inclination that is entirely absent from the *mackeri-aetherius* nature. This chain of fine races starts with the typical subspecies (*epiphron*) of the Harz Mountains in the west; then far to the east on the Altvater in the Sudetic Mountains we find the next (*silesiana*), and to the south, in the Algauer Alps, what may be an offshoot of it (*amisus*); and again further east in the Tatra (*transsylvanica*) which reappears in the Transylvanian Alps; and finally, far south in the Balkan ranges of the Rilo, Rhodope and Perim Mountains, we find the finest race of all (*orientalis*).

The presence of these races, lying along a curve of some 1200 miles or so in extent from west to south-east, cutting off *aetherius* from the north, raises doubts as to the possibility of the existence of *aetherius* in the British Isles so far to the north of this circum-alpine chain, especially as a distance of at least 800 miles separates it from the nearest point at which it is found in the Alps. The most direct route by which *aetherius* could have reached England is north-west from the more southern districts of the Alps. But here another barrier exists in the presence of *mackeri*, established in all suitable districts beyond the western side of the Alps from the Vosges to the Pyrenees. It is then obvious that the only possible routes left open, if indeed *aetherius* did pass westward from the Alps, were either over the Jura Mountains due west, or through the Black Forest to the north-west. But here, we are at once faced with the remarkable fact that *epiphron* does not exist in either of these mountain systems now. To suppose that *aetherius*, endowed as it is with greater powers of adaptation to environment than any of the other subspecies, should have died out in these seemingly suitable districts, seems incredible; yet the alternative is that it must once have occupied the Vosges. Were that the case, how is it that *mackeri* now occupies those mountains to the exclusion of *aetherius*? A glance at an orographical map of Europe will make all this much clearer to the reader; it will also help to emphasize how great a distance lies between the Alps and the broken chain of mountains that ring them from the Pyrenees in the west to the Balkans in the east, and in comparison with the restricted habitats of the *epiphron* races located in the circum-alpine chain, how great is the area over which *aetherius* has spread in the Alps. Yet, in spite of all this, there is no question but that the British insect is *aetherius*. To me there seems but one answer to these difficulties. The race *aetherius*, as such, never made its way from the Alps to England. I can only suppose that at the time when *mackeri* was extending its range, it did so, not merely southward, but to the east and west as well; the Vosges being the central starting-point. The western branch attained England, by which time it had evolved into *aetherius*, characterized by a tendency to develop a strongly-marked form as it passed north, apparently a reversion towards *mackeri*. The eastern branch attained the Alps, following the same line of evolution as the western evolved *aetherius*, but with the vastly greater area in which to spread there was no check to the evolution of the strain which consequently was carried to its greatest extreme and gave rise to the least-marked type, f. *nelamus*, at extreme altitudes. The southern branch remained in unchanged form, but all three retain in common the urge to spread, which carried the English race still westward to the borders of the Atlantic Ocean. The close relationship of the three branches is also testified to by the occurrence in each of individuals displaying the characters of the specialized forms of the others; ab. *mnemon* in the Alps, and ab. *nelamus* in England and Ireland, and ab. *mnemon* again, even in the Eastern Pyrenees.

In conclusion it may be noted that in future the English race should be known as *E. epiphron* subsp. *aetherius*, and that occasional specimens of ab. *mnemon* will occur with it; the Scotch race will be subsp. *aetherius* f. *mnemon*; the name *scotica* Cooke, will fall as a synonym of the latter.

Migration of Vanessa cardui L. in the Central Mediterranean.—Travelling from Liverpool to Mombasa by the S.S. "City of London," I had the opportunity of witnessing a very considerable migration of *V. cardui* in the Central Mediterranean. At about 4.30 p.m. on June 9, 1948, coming up on deck after tea, I noticed one or two specimens of *cardui* flying over the ship. We were then about fifteen miles north-west of Pantellaria Island, our course was approximately E.S.E., our speed about 16·7 knots. The weather was fine and sunny, the sea dead calm, and there was a very slight breeze from the east. The butterflies were flying from south to north at a height of from 4 to about 20 ft. above sea level. When they came to the ship they flew up and over, very often flying alongside for a few yards. I made several counts, and found that the butterflies were crossing at the rate of eight every five minutes. The flight was interrupted during the period that Pantellaria lay immediately to the south of us, but was resumed at the same frequency as soon as we were away from the island. In addition to the *cardui* I noticed one small dull Lycaenid and two white, fluttering moths, which might quite easily have been *Utetheisa pulchella* L. I was unable to catch any specimens of *cardui* in daylight, although I was later given three specimens that came aboard after dark, and were caught fluttering round the ship's lights, but I did catch one specimen of a *Spodoptera* sp., which unfortunately escaped when being transferred to the killing bottle, and which could not be definitely identified. The flight was still in progress at 7 p.m., when I had to go below for dinner. After dinner it was too dark to see, but I noticed no butterflies round the lights on the promenade deck, which were rather dim. A fellow passenger, however, reported that butterflies were coming aboard at 10.30 p.m. and fluttering round the brighter lights on the fore-deck, and a number entered the officers' cabins on the upper deck. I was given three examples and shown two others, and found them bright and unfaded in colour, obviously quite freshly emerged, but rather on the small side. Both sexes were present in the small sample I saw. My three specimens had been imprisoned under a tumbler and were resting quite quietly next morning. There were no signs of any violent fluttering, the paper under the tumbler being quite clean and free from scales, but the specimens were all slightly battered, doubtless due to their fluttering round the lights previous to capture. Writing from memory I can recall two previous records of *cardui* captured on board ships in the Mediterranean, both strangely enough relating to the same night (1926, Williams, C. B., *Trans. Ent. Soc. London*, 1926: 196), although the two ships were at a very considerable distance apart. Reference to the literature would probably produce further instances.—D. G. Sevastopulo, F.R.E.S.; Mombasa, June 27, 1948.

MOTHS AT A SUBURBAN STATION LIGHTS IN 1947.

By Eric Evans, F.R.E.S.

The insects in the list below were all found at a railway station less than twelve miles south-east of Charing Cross, flying round or settled close to electric lights, and passing observation was made almost daily, except for three weeks, throughout 1947. Moths were also commonly found at rest in daylight, usually less than six feet from a lamp. These I include as having been light-attracted. The one exception is *Catocala nupta*, the nearest of several being on a shop-front 50 yards from the station, but it should have its place in a light list; I saw one in an editorial room off Fleet-st. on August 16.

The station, among shops, serves a typical between-the-wars area of development of small homes, with ornamental and fruit trees in their gardens and some of the original birch and oak still standing, and further afield allotments and rough ground. Part of the old mixed wood, mainly birch, lies a mile away beyond another railway line.

An open footbridge carries lights, on all night, some 25 ft. above ground level. The booking-office end of the bridge is covered in, and this was where most of the moths were recorded, usually between midnight and 3 a.m. as I passed through on my way home. Undisturbed, unseen by rush-hour crowds and ticket queues, many moths sat out the day in obvious positions—*Sphinx ligustri* below the bridge parapet, *Boarmia roboraria* on the ticket inspector's booth, *Notodonta dromedarius* on an elbow-high ledge 2 ft. from the booking office window. *Pseudoips bicolorana* (at night) was on a platform indicator.

Two points of behaviour may be worth noting: (1) A drop in temperature, particularly in early spring, induces many moths to remain for long periods on one spot without moving. In one instance *Pheosia gnoma*, during a cool spell in May, clung for nine days and nights to the rim of a light reflector 2 ft. above the heads of people entering the station; I saw it twice every day exactly on the same spot. Others remained three or four days in one position. (2) A fresh species on its first night would sometimes appear suddenly in numbers, or several of one species would come on two or three nights only, suggesting a mass emergence. *Achlya flavicornis* appeared four out of five nights running at the end of March, then not again; four *Drymonia ruficornis* arrived together on May 10, the only night; half-a-dozen *Chesias legatella* turned up at once on October 14, and after that regularly in ones and twos.

The list began with *Erannis marginaria* in March as soon as the thaw was established, and though, in general, numbers varied and increased with temperature until the end of July, I have an impression that the prolonged drought brought about a greater falling off than would be normal in August, and September had several completely blank nights. At that time any slight humidity during the day seemed to produce a few more insects at night.

I could not always have a net with me, and to box the inaccessible had to resort to other devices—with the benevolent tolerance of the railway staff and the suspicious eye of the law turned to my own ends (I had one policeman hunting *D. ruficornis* with his torch). I found that the Prominents and some other species given to clinging to the rims of reflectors could be dislodged with the tip of a stick, falling straight below; sometimes insects circling a lamp could be induced to alight for a moment on a newspaper held to them.

Laothoë populi, three; *Sphinx ligustri*, one.

Drymonia ruficornis, four; *Pheosia tremula*, several; *P. gnoma*, very common; *Notodonta ziczac*, one; *N. dromedarius*, three; *Lophopteryx capucina*, several; *Pterostoma palpina*, one; *Phalera bucephala*, very common; *Clostera curtula*, five May, one August; *C. pigra*, one May, one late July.

Habrosyne derasa, several; *Tethea duplaris*, one; *Achlya flavicornis*, fairly common.

Dasychira pudibunda, several; *Euproctis similis*, very common; *Lymantria monacha*, one male.

Malacosoma neustria, fairly common; *Poecilocampa populi*, two males; *Gastropacha quercifolia*, both sexes fairly common.

Drepana binaria, three; *D. falcataria*, two; *D. lacertinaria*, three; *Cilix glaucata*, common.

Pseudoips bicolorana, one.

Spilosoma lubricipeda, very common; *S. lutea*, common; *Phragmatobia fuliginosa*, common; *Arctia caja*, common; *Callimorpha jacobaeae*, several.

Apatele leporina, one; *A. megacephala*, three; *A. psi*, one; *A. rumicis*, one; *Cryphia perla*, abundant; *Agrotis clavis*, one; *A. exclamationis*, one; *Amathes c-nigrum*, very common; *A. triangulum*, one; *A. xanthographa*, abundant; *Ochropleura plecta*, two; *Axylia putris*, two; *Triphaena pronuba*, fairly common; *Mamestra brassicae*, fairly common; *Melanchra persicariae*, common; *Ceramica pisi*, common; *Diataraxia oleracea*, common; *Hadena trifolii*, very common; *H. serena*, five; *Cerapteryx* *graminis*, one; *Dryobotodes protea*, several; *Luperina testacea*, abundant; *Thalpophila matura*, common; *Procus strigilis*, several, form *aethiops*; *Apamea obscura*, two; *A. sordens*, two; *A. secalis*, several; *A. lithoxylea*, two; *A. monoglypha*, fairly common; *Dypterygia scabriuscula*, one; *Meganephria oxyacanthae*, one; *Hydraecia oculea*, two; *H. micacea*, common; *Gortyna flavago*, several; *Rhizedra lutosa*, two; *Leucania pallens*, common; *L. impura*, several; *L. comma*, one; *L. lithargyria*, fairly common; *L. conigera*, common; *Caradrina morpheus*, one; *C. blanda*, common; *C. alsines*, a few; *Laphygma exigua*, one; *Petilampa minima*, one; *Rusina umbratica*, two; *Amphipyra pyramidea*, several; *Cosmia trapezina*, two; *Orthosia gothica*, common; *O. cruda*, fairly common; *O. stabilis*, one; *O. incerta*, fairly common; *O. munda*, one; *Atethmia xerampelina*, four; *Omphaloscelis lunosa*, very common; *Tiliacea aurago*, one; *Cirrhia icteritia*, two, one *flavescens*; *Eupsilia transversa*, two; *Cucullia chamomillae*, two.

Phytometra viridaria, one; *Scoliopteryx libatrix*, one; *Plusia chrysitis*, common; *P. gamma*, fairly common; *Abrostola tripartita*, three; *Catocala nupta*; *Hypena proboscidalis*, several.

Pseudoterpna pruinata, one; *Hipparchus papilionaria*, three; *Comibaena pustulata*, two, one "pink form" (*antea*, **80**:286); *Hemithea aestivaria*, several; *Sterrha seriata*, fairly common; *S. fuscovenosa*, common; *S. aversata*, very common; *S. dimidiata*, two; *S. trigeminata*, one; *S. emarginata*, four; *Scopula marginepunctata*, one; *S. imitaria*, three; *Calothysanis amata*, very common; *Cosymbia punctaria*, one; *C. albipunctata* (*pendularia*), three; *Anaitis plagiata*, two, one Oct. 14; *Chesias legatella*, fairly common; *Ecliptopera silaceata*, two; *Lygris mellinata*, four; *Dysstroma truncata*, fairly common; *Xanthorhoë spadicearia*, one; *X. fluctuata*, common, one *costovata*; *Colostygia didymata*, one; *Ortholitha bipunctaria*, three; *O. chenopodiata*, common; *Larentia clavaria*, one; *Oporinia dilutata*, abundant; *Operophtera fagata* (*boreata*), common; *O. brumata*, very common; *Pelurga comitata*, four; *Epirrhoë alternata*, several; *Euphyia bilineata*, several; *Lyncometra ocellata*, one; *Nycterosea obstipata*, one; *Horisme vitalbata*, two; *Eupithecia centaureata*, very common; *E. linariata*, one; *E. absinthiata*, two; *E. vulgata*, one; *E. virgaureata*, two; *E. succenturiata*, one; *E. icterata*, one; *E. subnotata*, one; *Gymnoscelis pumilata*, common; *Chloroclystis rectangulata*, two *nigrosericeata*; *Lomaspilis marginata*, one; *Gnophos obscurata*, five; *Cabera pusaria*, common; *C. exanthemata*, several; *Itame wavaria*, fairly common; *Chiasmia clathrata*, very common; *Erannis aurantiaria*, very common; *E. marginaria*, common;

E. defoliaria, abundant; *Deuteronomos alniaria*, fairly common; *D. fuscantaria*, very common; *D. erosaria*, one, mid-July; *Selenia bilunaria*, several; *Gonodontis bidentata*, fairly frequent; *Crocallis elinguaria*, fairly common; *Colotois pennaria*, common; *Opisthograptis luteolata*, common; *Lithina chlorosata*, one; *Ourapteryx sambucaria*, common; *Lycia hirtaria*, one; *Biston strataria*, one; *B. betularia*, three *carbonaria*; *Boarmia roboraria*, one; *Cleora rhomboidaria*, three; *C. repandata*, several; *Ectropis bistortata*, common; *Aethalura punctulata*, one.

Hepialus lupulina, several; *H. humuli*, common.

The following, present in 1946, failed to be observed at the lights last year: *Cerura vinula*, three; *Stauropus fagi*, one; *Triphaena comes*, one; *Apeira syringaria*, two; *Zeuzera pyrina*, one, *Hepialus sylvina*, one.

26, Towncourt Crescent,
Petts Wood,
Kent.

SARROTHRIPUS DEGENERANA HB.—In his monograph of *S. revayana* Scop. (1919, *Entomologist*, **52**) Sheldon mentioned one specimen of "ab. *degenerana* Hb.," taken some years before 1919 in the New Forest (*op. cit.*, 127). Had this determination been correct the capture would be of unusual interest, because *degenerana* is extremely scarce in Western Europe. From Holland only two specimens are known; these must be looked upon as vagrants. *S. degenerana* Hb. is not a form of *revayana*, but a very distinct species, the caterpillar of which is associated with *Salix*, whereas *revayana* is an oak species. It is more heavily built than *revayana* (larger, wings broader), and the genitalia are very different in both sexes.

During my short visit to the British Museum (Natural History) I was able to examine the specimen in the Sheldon Collection. It was at once clear that the author was wrong. The moth is an undoubted specimen of *S. revayana* Scop., but of a beautiful colour form, which I have never seen before, and must be very scarce. In order to avoid further confusion I distinguish this form as ab. **virescens**, ab. nov. Description: Fore wings pale greenish with a dark central band. Type: The specimen in the Sheldon Collection.

The existence of this form is of some importance, because it definitely proves that *S. revayana* is also able to produce forms with a pale green ground-colour. The type as described by Scopoli (1772, *Annus historico-naturalis* **5**: 116) must have had about the same greenish ground-colour, but showed the black *ramosana* streak. I have not seen it mentioned in literature, nor have I ever seen a specimen belonging to it. As the *ramosana* character is certainly not common, and as the *virescens* ground-colour is very rare, we must conclude that Scopoli's type form is also rare.—B. J. LEMPKE; Oude Yselstraat 12^{iii}, Amsterdam—Z2.

A NOTE ON THE GENUS *EPINA* WALKER (LEP.-PYRAL.).

BY A. P. KAPUR.

(Commonwealth Institute of Entomology.)

THE genus *Epina* Walker (1866) was erected for the reception of a single species, *Epina dichromella* Walker (1866), which was transferred to *Chilo* Zincken by Hampson (1885), with the result that *Epina* was sunk as a synonym of the latter. Walker did not give any locality for the species, and based his original description on a single specimen which he considered to be a female. Hampson (1896) came across a specimen from Bhutan, India, and described it as a male of the above species. In the course of the present writer's studies on some of the Indian species of *Chilo*, the genitalia of the above-mentioned two specimens were examined and were found to be males and not identical. Whereas the genitalia of the specimen from Bhutan agreed in general with those of the other species of *Chilo* (*sensu lato*) from India, that of *dichromella* recalled the structure of the genitalia of some New World species. It was found to correspond in every detail with the male genitalia of *Diatraenopsis differentialis* (Fernald), as described and figured by Dyar and Heinrich (1927). The type of *dichromella* possessed also the other characteristic features of the genus *Diatraenopsis* Dyar and Heinrich (1927), and tallies with its genotype species *Diatraea differentialis* Fernald, as given in the original description (1888) and in the coloured illustration of the species. The writer thinks that the two species are, therefore, synonymous with each other, and as they are the genotypes of *Epina* Walker and *Diatraenopsis* Dyar and Heinrich, respectively, the latter generic name would also sink. *Diatraea idalis* Fernald (1896), which was transferred to *Diatraenopsis* by Dyar and Heinrich, should also now be referred to the genus *Epina*.

The writer wishes to express his thanks to Mr. W. H. T. Tams for his kind co-operation in this study.

REFERENCES.

DYAR, H. G., and HEINRICH, C. (1927), *Proc. U.S. nat. Mus.*, **71**, art. 19, p. 39, pl. x, fig. 34.

FERNALD, C. H. (1888), *Ent. Amer.*, **4** : 120.

Idem (1896), The Crambidae of North America, *Special Bull. Mass. Agr. Coll.*, p. 77, pl. vi, fig. 7.

HAMPSON, G. F. (1885), *Proc. zool. Soc. Lond.*, 1885, 954, 955.

Idem (1896), *Fauna of British India*: Moths, **4** : 27.

WALKER, F. (1866), *List Specimens Lep. Ins. Brit. Mus.*, **35** : 1707.

SOME GEOGRAPHICAL NOTES ON WEST CHINA LOCALITIES.

By K. J. Fisher (Mrs. Richardson),
Assistant Professor of Entomology,
University of Nanking.

During the past fifty years many collections of Lepidoptera and other insects have been made in the mountainous border country between Tibet and China. Leech, Pratt, and other Englishmen and Americans took many specimens, but the greater number were sent to the French entomologist, Charles Oberthür, by Roman Catholic Missionaries and their native collectors.

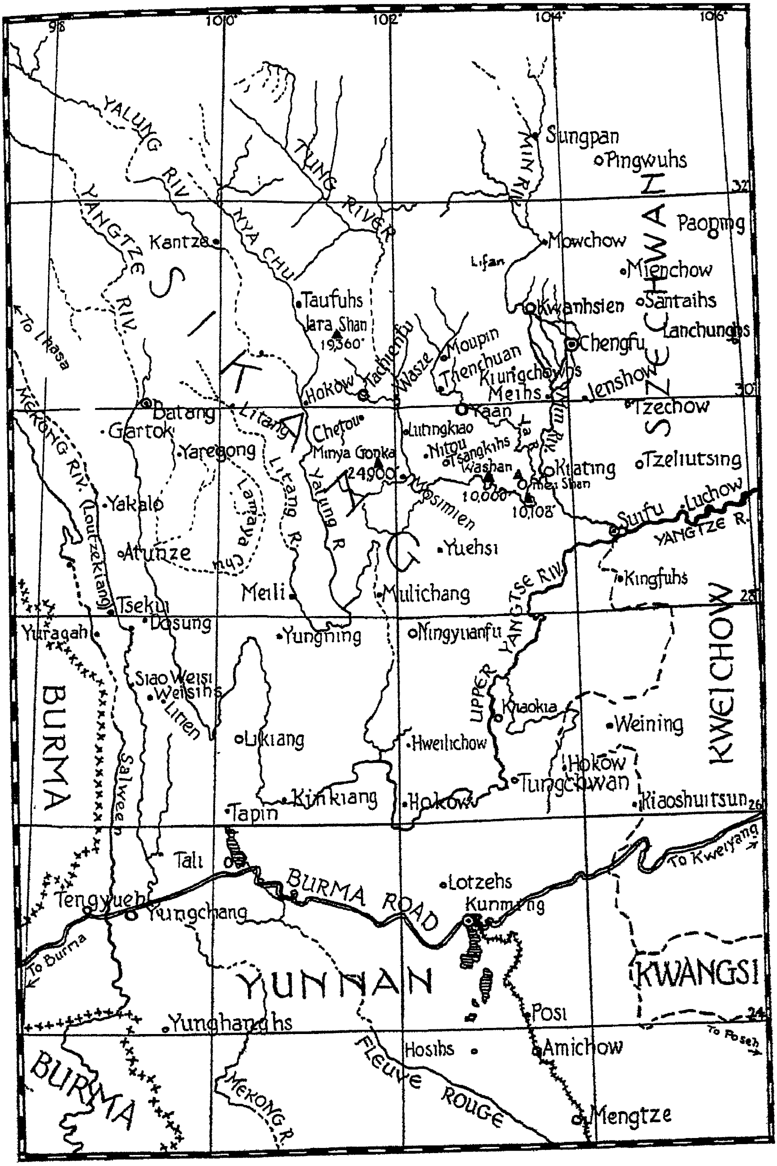
During this period the Sino-Tibetan Frontier has been in frequent movement, generally westwards, and as a result many, particularly of the earlier specimens, have been ascribed to Tibet, although they would certainly not be considered Tibetan to-day. The entomologist who wishes to study distribution is thus constantly puzzled to find large, tropical-looking species described as "Tibetan," and will find himself wondering whether it can possibly be true that such insects as *Troides aeacus* are really to be found in the high mountains, flapping about among the *Parnassius* and *Erebias* of the grasslands.

The systematist who wishes to identify the locality from which his types have come is also frequently at a loss. His specimen may be labelled with something resembling a Chinese place-name, though perhaps weirdly spelt; he refers to a map and cannot find it. A second map does not help him, and may make his confusion worse by varying the spelling of all or most of the names given on the first. Finally, he may find that even large and obviously important cities, clearly identical from their position on lake or river confluence, are given completely and unmistakably different names on two maps—for example, the capital of Yunnan Province, sometimes called "Yunnanfu" and sometimes "Kunming."

The following notes and the accompanying map are offered in the hope of clearing up some at least of these difficulties. My thanks are due to the Keeper and the Staff of the Entomology Department of the British Museum (Natural History), who have been so kind to me while I was working on the collections, and to Dr. H. L. Richardson, who has helped me with the map.

The Spelling of Chinese Place Names.

Most people are aware that Chinese writing is ideographic. A Chinese character is not an assemblage of phonetic units, as an



Sketch Map of Sino-Tibetan Marches. Scale 1/4,000,000 : 1 inch = 63 miles alphabetic word is, and it may be pronounced quite differently by people from different provinces, although they all understand the same meaning. In the same way, the arabic numeral 5 is read by an Englishman as "Five," by a Frenchman as "cinq," and by a German as "fünf," although it means the same to them all. The difficulties which arise in Romanizing the characters are obvious; not only may the character be very differently spoken by different Chinese, but the hearer will spell the resulting sound differently, according to whether he is French, English, or so on. The Englishman hears a sound and writes it "Kang"; the Frenchman is as likely to write "Kin" as anything else. This is the source of much of the trouble about Oberthür's specimens.

The Chinese are as much aware of this difficulty as anyone else, and have tried at different times to stabilize the romanization of their language by the adoption of one or another official system. The most used of these for ordinary Chinese words has been the "Wade" system, familiar to the ordinary reader by its multitude of apostrophes, and the little figures perched up in the corner of each word which indicate the tones so important in Chinese, e.g. k'ang^3. Another system recently adopted is the "Gwoyeu Romatzyh," in which the tones are suggested by the arbitrary alteration of the spelling of each word. The Chinese Post Office has its own official romanization, simple to look at, ignoring tones, and varying in the transcription of many of the characters to suit the local language or dialect form. This system is very largely used on maps. The Ministry of Communications issues a yearly List of Post Offices, which gives a complete list of every town or village big enough to have its own post office, in the official romanized form, together with the name of the nearest larger town (Telegraph Office) and the Province. This valuable book is strongly to be recommended to any entomologist who deals frequently with Chinese insects.

The Chinese are very fond of changing names, whether their own, those of periods of years, or those of cities. Since the rise of the Republic there has been a great outburst of new place-names, many of which are, in fact, ancient names revived. Some of the more important of these changes are:

Pekin, the old capital (the name means "Northern Capital"), now called Peiping (meaning "Northern Peace").

Tachienlu or Tatsienlu (from the old Tibetan name, Da Dsen Do) to Kangting.

Yachow, on the Ya River (capital of the new Province of Sikang, which has been made from part of Tibet and part of the old Province of Szechuan), now Yaan.

Batang, on the Upper Yangtze River in Chinese Tibet, now Paan.

Lanchow, capital of Kansu Province, now Kaolan.

Chungking, the wartime capital of China, is Pahsien.

Suifu, an important river port at the confluence of the Yangtze with its chief western tributary, the Min River, once known as Hsü-chow-fu and now called Ipin.

Kiating, or Kiatingfu, near Omei Mountain, now called Loshan.

Note: the letters "hs," often seen after a name in the modern style, e.g. Pahs, Loshanhs, are short for "hsien"; see below.

This list could be multiplied indefinitely. Reference to the War Office map is useful here, because it gives both names in many places. Sometimes the new name simply hasn't caught on; Chungking keeps its old name, and Kiating is usually referred to thus. The Chinese talk of Kangting; Tibetans usually prefer Tachienlu.

Under the Manchus, towns were classed according to importance, and many of their names ended in the syllables -fu, -ting, -chow or -hsien, according to size. The first three endings have now been dropped in most cases, but the -hsien ending is still kept, and is valuable in indicating a county town. As such, -hsien towns are of some importance, and are to be found on most maps. On some French maps the word is spelt "hien." Collectors should always try to indicate the name of the Hsien or county in which their localities lie.

(To be continued.)

NOTES AND OBSERVATIONS.

THE SUCCESSFUL HIBERNATION OF A BROOD OF COLIAS CROCEUS AB. HELICE.—Last autumn, when the Clouded Yellow was so common, a friend of mine, Mr. J. Honeybourne, of Chelmsford, Essex, told me he was going to try and hibernate a brood of larvae. I told him I did not think he stood any chance of success as the species was not a true hibernator; in fact it was doubtful if it hibernated at all in any stage in its native haunts. But I challenged him to try it, and here is the story of his success.

In mid-September three ab. *helice* and three male *croceus* were captured in a lucerne field at Rettendon in Essex. They were placed together in a cage 18 in. by 18 in. by 23 in., in which stood pots of black medick, lucerne and wild white clover, and a few wild flowers in water and a sugar pad. Only one pairing was actually seen, but Mr. Honeybourne, being a farmer, had little time to watch them during the day. The females laid a number of ova on all the plants, but appeared to favour the lucerne, but this may have been because it was in the lightest part of the cage. When the plants were well dotted with eggs they were removed from the cage and sleeved with fine muslin, and so there was no overcrowding. During the winter all the pots were kept in a lined shed with windows facing south, until about the middle of December, when they were transferred into an unheated bedroom facing south. By about the middle of January 25 per cent. of the larvae had died off. On February 18 Mr. Honeybourne moved from Essex to Wilmington, Kent. Owing to exposure during the move, when the larvae and their food-plant were badly frosted, only forty survived the journey. On March 9 all the remaining larvae were transferred to a fine crop of black medick that had been planted up in an old sink the previous autumn. The food-plant had stood outside all the winter, but had been covered over with sacking whenever severe weather threatened. In their new surroundings the larvae flourished, and the first one spun up on March 24. By April 18 ten more had turned, and there were still a few larvae nearly full fed on the black medick, and several only half grown ones. It should perhaps be mentioned that up to the time that the larvae were transferred to the sink they never came into contact with water, as the pots were always stood in a bucket to about 1½ in. from the rim, so that the surface soil was kept perfectly dry. About the third week in April the first chrysalis began to colour up, on April 23 a perfect male emerged, and on April 30 the first ab. *helice* emerged, and on May 3 a second. Mr. Honeybourne had accomplished what he had set out to do. In my opinion, given reasonably good weather in May, he has every chance of carrying on the race—something that I don't believe has ever been achieved before.

It comes almost as a postcript to be able to add that I have just heard from Mr. Guy R. S. Willson, of Dartmouth, Devon, that during the last week-end in April he saw two males and a female of this species in the Exmouth district. Have they hibernated in the West of England out of doors, or were these specimens early migrants ?—L. HUGH NEWMAN, F.R.E.S. ; "The Butterfly Farm," Bexley, Kent.

POLYGONIA C-ALBUM AND PARARGE AEGERIA IN LINCOLNSHIRE.—With reference to J. H. Duddington's report (1948, *Entom.*, **81** : 124) on Lincolnshire butterflies, I saw a *Polygonia c-album* several times flying along a ride near a wood at Grasby Bottom in the afternoon of July 20, 1947 ; another alighted on bramble foliage near the woods near Elsham Golf Course (during the summer of 1947—I forget the exact date) ; I caught one in a neighbour's garden on September 27, 1947 ; and finally, I caught one at sallow blossom and one, a few yards away, on a sunny bank, both at South Ferriby Cliff, on March 26, 1948. Of *Pararge aegeria* I saw one within a hundred yards of my own garden on September 3, 1947, and others have been seen at Barton-on-Humber in 1947 and 1948.—M. P. GOOSEMAN ; 28, Westfield Road, Barton-on-Humber, Lincs.

THE COURTSHIP OF LYCAENA PHLAEAS.—For half an hour on May 7, at 3 p.m. B.S.T., in full sunshine, I watched an unsuccessful courtship between two fresh specimens of this butterfly, which is unusually abundant this spring. The courtship procedure was remarkably simple. The female sat for about two to three minutes with wings open on the leaves of various shrubs and plants, including hazel, dock, bramble, primrose and grass stems. She showed no pleasure at all in the attentions of the male, and after each period took a short flight of a few feet, when the process was repeated. The male butterfly showed great persistence; he always alighted immediately behind her to right or left, walked slowly close up to her with his head in the same direction, and twisted his abdomen into position for copulation with her. She did not appear to avoid his embrace particularly, but always flew off when it became critically close. The remarkable points about this prolonged and unsuccessful courtship seemed to be, first, the complete absence of tactile stimulation technique by the male use of his antennae or proboscis as always observed by me previously with other butterflies; secondly, the absence of wing fluttering or other scent-diffusion methods by both insects; I should be glad to know if anyone has ever observed a successful courtship of this species, and whether such techniques were present or absent.—G. W. HARPER, Cdr. R.N.; Rustington.

SOUTHERLY MOVEMENT OF VANESSA ATALANTA AND OTHER BUTTERFLIES.—While climbing up the Langdale Pikes in the Lake District, from above the New Dungeon Ghyll Hotel on September 21 last year, I noticed that single specimens of *V. atalanta* were passing me and coming apparently straight down the mountain from a northerly direction. I rested for a while at an altitude of about 1500 ft. and a butterfly passed me every few minutes. I was interested to note that the route taken did not vary by more than a few feet. After I had moved away I saw no more that day. In addition to *V. atalanta* I noted one *V. cardui* and one *Aglais urticae.* I have no explanation to offer for this movement or migration, if such it was. The weather was fine and calm.—A. H. OWEN; 169, Chaldon Way, Coulsdon, Surrey, June 19, 1948.

VANESSA CARDUI MIGRATING.—Yesterday, July 3, I saw a migration of *Vanessa cardui* pass across to the north of this parish. The details may be of interest. I was in a narrow lane at the time that runs between large cultivated fields and I first spotted three *cardui* hovering and dancing in front of me. Then another passed, and looking up the lane from which direction I had come I saw five more. The increase in numbers from then on was so rapid and so tremendous as to defy description. As if by magic the lane was filled with *cardui*, so much so that had I had my net, I am convinced that one sweep would have secured at least 50! I had only to put my hand out suddenly for several to bang into it, although they seemed to avoid hitting me. Through gaps in the hedge I was able to see that the fields on either side were a mass of *cardui*, pink with them, and they reached from ground level to about 400 ft., where against the dark sky they resembled a cloud of silver-grey smoke. The whole flock, if you can so call it, covered an area about ½ mile wide, while its length was difficult to calculate, though the cloud appeared long and thin, and took nearly an hour to pass. It was the largest mass migration of any creature that I have ever witnessed, and although bad at estimating numbers, I should say that several hundred thousand individuals were involved. They all flew N.W. towards the Wash, and none of them were observed to alight, or pause in their flight, save the first few, which hovered about, as though uncertain which direction to take. The wind at the time, about 10 m.p.h., was against them, and it was dull, threatening rain.—(Hon.) ROBERT GERARD, M.B.O.U.; Abbey House, Binham, Fakenham, Norfolk, July 4, 1948.

FOOD-PLANTS OF COLIAS CROCEUS.—I have frequently reared this species from the egg, and, for the convenience of transferring the young larvae to fresh leaves, used, to begin with, the smooth leaves of *Trifolium repens*; but, when larger, found the erect leafy stems of *T. pratense* the most suitable food-plant. In the year 1928 some late undersized specimens were bred on the latter plant as late as December, the larvae being kept in a warm living-room. It may be worth noting that in 1900—a good *Colias* year—I found an egg on a wild stem of *T. pratense*, where, being in the pink stage, it was fairly conspicuous.—R. M. PRIDEAUX; Brasted Chart, Sevenoaks, Kent.

HYLOICUS PINASTRI IN NORFOLK.—On June 21 I found a perfect female *H. pinastri* at rest on a Scots Fir here in Langley Park, not a hundred yards from the Hall. I carefully boxed her, and within 30 minutes she had laid four eggs. As females in captivity quite often lay their eggs before mating, I placed her in my open breeding cage and took her at dusk to the same tree, hoping to lure any males that might be about. I watched for some three or four hours but no males appeared, and she continued laying until about 11.30 p.m., and then settled to rest and remained so until the next evening, when she went on laying until about the same time, depositing in all some 85 eggs.—R. W. DAVEY; Langley School, Langley Park, Norwich.

LEPIDOPTERA IN SELBY, YORKSHIRE DISTRICT IN 1947.—Although situated a long way inland, there were many notable migrants to record in this district during 1947. I saw for the first time in this district *Colias croceus*, which occurred in some numbers, though not really common. I first noted it on August 10, but not later than September. The only Fritillary occurring in this district now, *Argynnis aglaia*, generally uncertain in its occurrence here, was fairly common in July, in one locality four miles from Selby. In the same locality another collector took a specimen of *Callophrys rubi*, which I have never taken in this district, though I have noted it common near York. In the moths there were several notable captures. *Acherontia atropos* was noted at Heck, seven or eight miles south of Selby, though perhaps my most notable capture was a perfect female of *Nycterosea obstipata* in a clover field near Selby on September 15. I also saw several *M. stellatarum* in September. In Selby I took a specimen of *Eupithecia subnotata* on July 11 and *Hemithea aestivaria* on July 4, both of which I have never previously seen in Yorkshire. *Catocala nupta* seems well established here now, and I saw several, both in 1946 and 1947, and first noted in 1943. I saw one in early

August, 1947, and as late as October 9 in 1946. *Zygaena trifolii*, which I never used to see, is now common round Selby. Second broods noted in 1947 included *Leucania pallens*, September 4, etc., *Hadena thalassina*, August 28, *Axylia putris*, September 1, etc., *Calothysanis amata* common in autumn. Also one *Cucullia umbratica*, September 27.—S. M. JACKSON; 15, Westbourne Road, Selby, Yorkshire.

AN ABNORMAL LARVA OF PAPILIO DEMOLEUS L.—The larvae of *P. demoleus*, in the early instars, are armed with a subdorsal series of spines, the first four somites having a pair of small dorsal spines and a lateral spine in addition. Normally only the subdorsal spines on the 1st (prothoracic) and 12th (9th abdominal) somites are retained in the last instar. I recently bred a larva, among a number of normal individuals, that retained, in addition to the usual spines, the subdorsal spine on the 4th, 10th and 11th somites. These were all large enough to be seen with the naked eye, but smaller than the spines on the 12th somite. Under a lens the subdorsal and lateral spines on the 2nd and 3rd somites could be discerned, and there was a minute bristle on the 5th somite, occupying the position of the spine of the previous instars. No abnormality was noticed in the earlier instars. —D. G. SEVASTOPULO, F.R.E.S.; Calcutta, April 11, 1946.

GASTROPACHA QUERCIFOLIA IN NOTTS.—I found a fine larva of the Lappet on a hawthorn bush by the side of a grass lane here at Upton on May 14, 1948. The species seems to be getting more common in the Midlands than it used to be.—A. S. B. F. P. WYNNE; Upton House, Upton, near Newark, Notts.

[Carr, *Invert. Fauna Nott.*: 156, writes, " v. rare and local."—ED.]

THE FOOD-PLANT OF EULYPE HASTATA, L.—In the latest edition of South's *British Moths*, Series II, it is stated in the appendix that *E. hastata* only feeds on birch. On the open moorlands of East Tyrone where there is no birch the larva of *hastata* is only found on *Myrica gale*.—THOMAS GREER; Cookstown, co. Tyrone.

NYCTEROSA OBSTIPATA IN N.E. HANTS.—I took a male of this species, somewhat worn but otherwise intact, at electric light in my kitchen early last evening.—PETER MICHAEL; 56, Cranmore Lane, Aldershot, Hants, November 8, 1947.

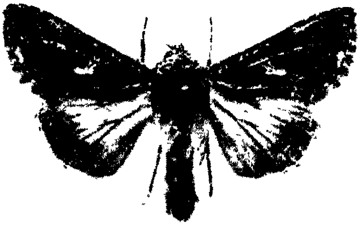
A GOOD DRAGONFLY LOCALITY.—On June 9 of this year I visited a quiet backwater of the River Thames, near Windsor, in search of Odonata. It was a hot, still afternoon, and as the backwater was well supplied with aquatic vegetation I expected to take several species, but was surprised and no less delighted to observe the following eleven species: *Brachytron pratense*, males very common, but only one female seen. *Anax imperator*, four or five males seen, two of which were taken. *Cordulia aenea*, common. *Libellula quadrimaculata*, very common; one var. *praenubila* was taken. *L. depressa*, two pairs seen. *Agrion splendens*, common; possibly migrated from the river, about a mile away. *Pyrrhosoma nymphula*, a few seen. *Ischnura elegans*, fairly common. *Coenagrion puella*, common. *C. pulchellum*, by far the commonest dragonfly seen here. *Erythromma najas*, common. On June 11 I visited this spot again and all the above species were present, but *pratense* was in greatly reduced numbers. I was fortunate, however, to see and net a fine male *Somatochlora metallica*.

On June 12 I visited the ponds at Epsom Common and saw the following species: *A. imperator*, *C. aenea*, *L. quadrimaculata*, *P. nymphula*, *I. elegans*, *C. puella*, *E. najas*, whilst *Lestes sponsa* was just out.

A visit to Esher Common on the 14th was rather disappointing, as few species were on the wing. One male *A. imperator* was seen hawking along the side of the small birches by the pond, whilst *L. quadrimaculata* and *Enallagma cyathigerum* were abundant. A few specimens of *I. elegans* and *P. nymphula* were seen, and eventually I came across four *Palaeobasis tenella*, which from their teneral condition had not long emerged.—E. Gardner; 55, Northcroft Road, W. Ewell, Surrey.

SOCIETIES.

The South London Entomological and Natural History Society.—*May* 12, 1948.—The President, Col. P. A. Cardew, in the Chair, announced the gift by Mr. S. N. A. Jacobs of a further section of Vol. II of Leon Lhomme's *Catalogue des Lépidoptères de France et de Belgique*. *Exhibits:* The President, a pale aberration of *Lycia hirtaria* from Wimbledon, Surrey, April 19, 1948; Mr. Everett Warrier, young larvae of *Saturnia spini* descended from a female taken during the Italian campaign by Mr. R. F. Haynes; Mr. L. S. Whicher, *Aphodius merdarius* F., *A. subterraneus* L., and *A. distinctus* Muel. (Col.), from Eversley, North Hampshire; Baron de Worms, a larva of *Pseudoips bicolorana*, after hibernation; Mr. T. G. Howarth, a larva of *Panaxia dominula* with two anterior dorsal tubercles missing on the 6th abdominal segment; Mr. E. W. Classey, on behalf of Mr. C. F. Astbury, a living female of *Meloë proscarabaeus* L. (Col.), Wyre Forest, Worcs, May 8, 1948; Mr. W. H. Spreadbury, empty nymph skins of *Libellula depressa* collected at the pond on Ranmore Common, Surrey, where the species was this year abundant. Captain Jackson, R.N., called attention to the fact that the spring brood of *Lycaena phlaeas* was exceptionally abundant in Hampshire this year, although it is, as a rule, rather scarce. On May 9 he had found it in plenty, with large numbers of *Panemeria tenebrata*, which was just emerging. He also said that he had heard of a specimen of *Hyloicus pinastri* being taken in the Newbury district, Berks, at the beginning of May, in worn condition, probably having been on the wing at least a week. Another very early emergence was that of *Pachetra sagittigera* (*leucophaea* Schiff.) a male specimen of which came to light near Wye on April 27, the earliest date previously being recorded as May 25. Other members reported *Argynnis selene* on May 5, *Stauropus fagi* on May 9, and *Agrotis puta* on April 21. Mr. R. F. Haynes read a paper, illustrated by lantern-slides, on " A Visit to Killarney."—T. R. Eagles, *Editor*, 32, Abbey Road, Enfield, Middlesex, May 22, 1948.



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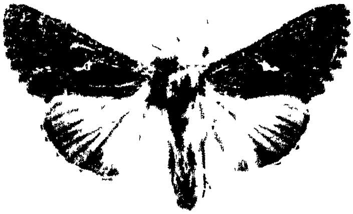

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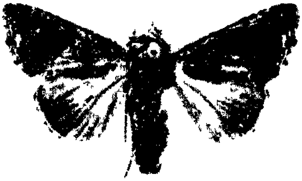

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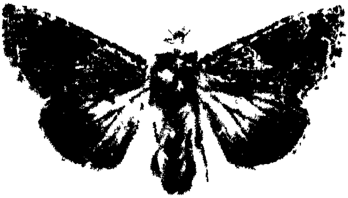

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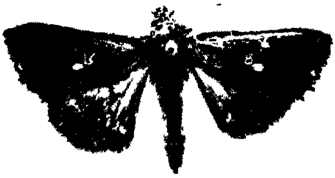

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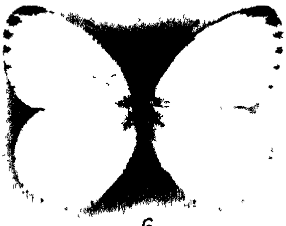

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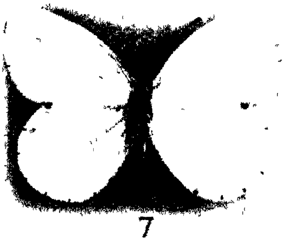

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FIGS. 1–5.—Fig. 1, *Plusia limbirena* Guenée, the Scar Bank specimen; fig. 2, *P. limbirena* Guenée, from India; fig. 3, *Plusia furcifera* Walker, from India; fig. 4, *Plusia ogorana* Holland, from West Africa; fig. 5, *Plusia aenescens* Prout, from Africa. All about 1½ times natural size (see p. 201).

FIGS. 6, 7.—Fig. 6, upperside; 7, underside of *Mylothris carcassoni* sp. nov. (see p. 203).

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A *PLUSIA* NEW TO BRITAIN.

By ARCHIBALD G. B. RUSSELL, C.V.O., F.S.A., F.R.E.S.

(Plate I, figs. 1–5.)

ON the night of September 13 last, when, returning from a collecting expedition in another part of Dorset, I was approaching my house at Swanage at about 1.30 a.m., a *Plusia* flew to my light trap (which I had left on during my absence), where several friends, who had come on from a dance, were awaiting me, among whom were Mr. and Mrs. Stedall. The specimen was observed by Mrs. Stedall and boxed by her husband, who at the time took it to be an example of *Plusia gamma*, with an unusual "gamma" mark. It was clear, however, on subsequent examination that it could not be of this species, and that there was difficulty in reconciling its identity with any of the known British representatives of this genus. I accordingly submitted it to Mr. Tams of the British Museum, who with remarkable clarity of vision and memory determined it at sight as *Plusia limbirena* Guenée (Plate I, figs. 1 (Dorset), 2 (India).

The question as to how the insect, of which there is no previous British record, reached these shores must remain a matter of conjecture. The specimens in the Museum collection mostly derive from the easterly side of Africa, from British East Africa southwards to the Transvaal, including the Island of Madagascar. The remainder are from Aden, Mauritius, St. Helena, Ceylon and the Nilgiris. Mr. Tams suggests as possible alternatives, either that the insect or its parents (as imago or cocoon) may have been conveyed here by aeroplane, perhaps from Uganda, or that it or they may have been caught by an upward current of air into the higher atmosphere, and eventually alighted here. It seems likely that a number of our immigrants find their way to this country by the latter means. At a recent meeting of the South London Entomological and Natural History Society, when the great immigration of *Rhodometra sacraria* was discussed, "it was thought that the moths had been brought from Africa by high air currents and had bred rapidly here under the abnormally favourable weather conditions of 1947."

The moth is in brilliant condition, and is possibly on that account to be regarded as the offspring of immigrant parents. It is conspicuously more brightly marked than any of the specimens in the Museum collection, particularly in respect of the white vertical stroke adjacent to the outer margin (termen) of the fore wings. This may on the one hand be taken as denoting British birth, just as in the case of *R. sacraria* British born specimens were found on average far to surpass continental forms in size, variety and tinting. Or, on the other hand, as further specimens are available from the native haunts of the species, it may point to an origin in an area where like examples occur. The insect has been named by Mr. I. R. P. Heslop in his lately published list of British insects with their English names, the "Scar Bank Gem," after Scar Bank House, where it appeared.

My thanks are due to Mr. Tams for the excellent photographs he has kindly taken of *P. limbirena* and allied species, to illustrate the present note. These are reproduced on Plate I as follows.

Scar Bank House,
Swanage, Dorset.

HYLOICUS PINASTRI IN HERTS.—On the night of July 31 to August 1, a female *H. pinastri* in good condition was attracted to our light trap and boxed when settled on the outside. The spread of this fine insect appears to be continuing. We had not seen it previously nearer Hertfordshire than the New Forest.—J. H. and P. J. BELL; Dudswell Rise, Berkhamsted, Herts.

NEW FOREST NOTES.—The following observations made in the New Forest district this season may be of interest to readers. The population of *Nymphalis polychloros* appears to have increased this year. I myself have found three nests of larvae, two fairly high up in cherry trees and one on a sallow bush. There have been reports of a large number of imagines seen earlier in the year in the Isle of Wight. All Hairstreak larvae have been early this year except *Thecla quercus*, which seems to have been normal in larva and pupa stages. *Lycaenopsis argiolus* has been extraordinarily rare this season. I have seen only one female and two males. Perhaps this has something to do with the abnormally cold winter of 1946–47, because I noted very few last autumn. *Aricia agestis*, *Erynnis tages*, *Syrichtus malvae* and *Pararge aegeria* have made their appearance late. Four female *Colias croceus* were noted in May. *Melitaea cinxia* has been scarce in every stage, especially in the larva stage. Many cripples, especially of the smaller insects such as *Lycaena phlaeas*, *Polyommatus icarus*, etc., have emerged. Perhaps this is due to the abnormally dry weather.—Sir MURDOCH McLEOD, Bt., F.L.S., F.R.E.S.; Culverlea House, Pennington Lymington, Hants.

A NEW SPECIES OF *MYLOTHRIS* HB. (LEPID., RHOP., PIERIDAE) FROM SOUTHERN RHODESIA.

By G. van Son, M.Sc.,
Transvaal Museum, Pretoria.

(Plate I, figs. 6, 7.)

Mylothris carcassoni sp. nov.

Diagnosis.—Smaller than *M. trimenia* Butler and *M. sagala* Smith, to which species it is most nearly related, and from which it further differs in the following features: the upperside of both wings is sulphur-yellow; the marginal spots of hind wing are almost obsolete; the valve of the male is subangular at middle and end of costa (evenly rounded in both *trimenia* and *sagala*) (*cf.* Fig. 1); and the antenna is longer in proportion (antenna-wing ratio 0·5 in *carcassoni* as against 0·47 in *trimenia* and 0·49 in *sagala*).

Holotype.—Male, Banti Forest Reserve (6000 feet), Umtali District, S. Rhodesia, September 21, 1947 (N. Mitton); in the Transvaal Museum Collection.

Description.—*Head*, antennae and palpi black above; shaft of antenna very slightly checkered with white below; palpi white at both sides, narrowly black below. *Thorax* and *abdomen* black above, with whitish hairs, thorax below with white and a few black hairs along middle, lemon-yellow ones at sides and orange-yellow ones in front; abdomen below sparsely clothed with mixed white hairs and scales along middle, with denser creamy-white scaling along pleural grooves; legs black, with black bristles and white scaling.

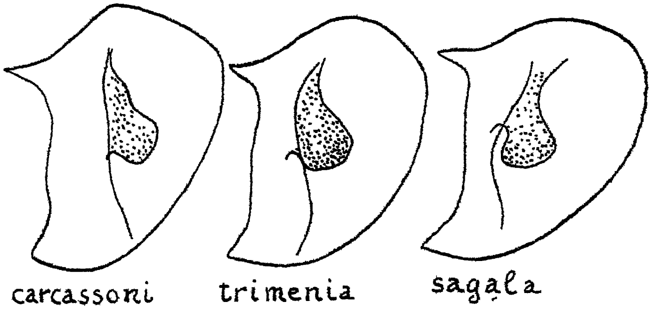

Fig. 1.—Valves of *Mylothris carcassoni*, *M. trimenia* and *M. sagala* for comparison.

Wings.—*Upperside:* Ground colour of both wings uniformly light sulphur-yellow, dusted with black at base; *fore wing* with the costa dusted with black, this dusting being almost obsolete opposite upper angle of cell, thence very narrow, but of a denser black, and meeting the rather narrow black apical area at four-fifths of the costa from base ; a series of black, inwardly angular marginal spots on veins Cu_2–M_1, that on Cu_2 being very minute ; no marginal spot on vein A_2. *Hind wing* with the marginal spots almost obsolete, those on veins SC and A_2 being larger than the rest. *Underside: fore wing* creamy white, except in the apical and the upper half of marginal area, where it is lemon-yellow, tinged with cadmium-yellow ; cilia blackish, except in the lower half of the marginal area where they are light yellow ; *hind wing* light lemon-yellow, tinged with cadmium-yellow in the costal area ; marginal spots a little larger and more densely black than on upperside.

Expanse 45 mm.

This most unusual-looking *Mylothris* belongs to the *trimenia*-group which is characterized by the absence, in the male genitalia, of an apical projection in the vulva, and by the broad and rounded sclerotized process of the valve. But, while in both other members of this group, i.e. *trimenia* and *sagala*, the valve is evenly rounded, it is distinctly subangular at middle and end of costa in *carcassoni*, a feature observable even without dissection with the help of a pocket lens. I am complying with the wish of the collector in naming the species in honour of our mutual friend, Mr. R. H. P. Carcasson, who had noticed the occurrence of this unusual butterfly in the neighbourhood of his farm, and was present during its capture.

NYMPHALIS ANTIOPA IN NORFOLK.—I caught a Camberwell Beauty on a Buddleia bush here on Friday last, July 31.—DAVID COOPER ; Marsh Corner, Lynn Road, Terrington St. Clement, King's Lynn, Norfolk.

EUPLAGIA QUADRIPUNCTARIA IN WEST SUSSEX.—I was recently shown a fine specimen of *Euplagia quadripunctaria* taken near Arundel in August, 1946, by Mr. P. Challen, who had picked up the insect from a road surface where it lay stunned after collision with some passing vehicle. Mr. Challen has kindly given me the specimen, which is a female, in excellent condition, of var. *lutescens*. —G. HAGGETT ; 1, Torton Hill, Arundel, Sussex.

BRITISH COLIAS ALFACARIENSIS.—In his recent article on the new British *Colias* Monsieur Lucien Berger says there are several specimens without data in the Zoological Museum, Tring. He must mean that he had no record of the data. There are nine males with the following data, 3 Gravesend, 1892, Tutt ; 5 Weymouth, 1900, Edwards ; 1 Folkestone, 1911, Austin. In answer to Mr. Riley's question in the July number I can say that *Colias alfacariensis* was taken last year. A friend of Mr. A. L. Goodson saw several flying in from the sea and took four in ten minutes, 20.viii.1947, at Folkestone.—E. A. COCKAYNE ; Zoological Museum, Tring.

DREPANA HARPAGULA, ESP. (*SICULA*, HÜBNER).

A Short Review of its Past History and Present Status.

By C. G. M. de Worms, M.A., Ph.D., F.R.E.S.

Little in recent years has been heard of or written about this elusive insect, always regarded as a great prize by the collector. Since only very intermittent reports of it have appeared over a long period, I have thought it of interest to give a short review of its history in this country, together with my own experiences which were not included at the time in my annual accounts of collecting of British Lepidoptera.

The Scarce Hook-tip moth has well earned its name as being the rarest of our five indigenous species of the Drepanidae. What is more, it has only been recorded from the Leigh Woods on the Somerset bank of the river Avon bordering Bristol. It therefore shares a distinction with a very small number of our Lepidoptera in being known to occur only in a single restricted locality. It is not easy to appreciate why this insect should come within this group. So far as this country is concerned, the larva of *Drepana harpagula* feeds exclusively on the small-leaved lime (*Tilia parvifolia*) which is found in many places besides the Leigh Woods. In Europe, though widespread, it is never common, but is much more cosmopolitan in its diet, feeding on the common lime, birch, oak and even beech. In this respect one is reminded of the somewhat analogous case of our British race of *Papilio machaon* which is confined to the fenland of the Eastern Counties. The perfect insect is very sluggish, certainly by day, and nearly all the early specimens were obtained by rearing larvae beaten from the limes. In this country it is single-brooded, usually appearing during the last fortnight of June.

As to its history, it was first discovered in the Leigh Woods in May, 1837, by a Mr. Mitford on a slope near the Avon gorge. This original specimen was presented to the Rev. Burney. Apparently no other example was taken till 1856, when B. H. Vaughan recorded one. According to Barrett (**3** : 69), several were obtained in 1861, one in 1873, and from 1874 till 1887 a few were found almost annually, mainly by W. H. Grigg and a few local collectors who bred them from larvae. There were no records from 1887 to 1891, but from then onwards some were taken nearly every year. Mr. C. G. Griffiths, a very keen Bristol collector, bred it several times towards the end of last century, while Prof. R. Meldola reared six in 1899 (*Entom.*, **54** : 9). There are not many records for the earlier years of the present century, though no doubt a fair number were captured. On Sept. 21, 1922, Mr. Griffiths beat a larva which was apparently the first to be obtained since 1915 (*Entom.*, 57 : 61) in which year no less than five were secured. We next hear of a male netted at 2 a.m. by Mr. Kromler, of Bristol, on June 21, 1925. This appears to be the first record of this insect to be taken at night. Mr. Granville Clutterbuck records a larva beaten out on Sept. 29, 1929.

I now come to more recent times and my own experiences with this attractive species. My first visit to the Leigh Woods was on Sept. 1, 1933, in company with Mr. Ian Heslop. On this occasion we happened to meet one of the keepers who showed us a spot among the larger lime trees where several larvae of *D. harpagula* were obtained the previous year. So far as I was aware, no one had hitherto tried for this insect with high-powered lights. We considered this means of attraction likely to prove the most profitable. It was not, however, till 1935 that I revisited this locality with Mr. N. G. Wykes on the evening of June 22. It had been a very warm day and conditions were ideal. We were able to manoeuvre the car into a suitable ride among the limes. I well remember a dark moth fluttering to the headlights about 10 p.m. and the thrill when we saw it was a very fresh *D. harpagula*. Between this hour and midnight we took five more males, all in equally good order. I made a further expedition to this locality in 1937 with Mr. Archibald Russell on June 19. We pitched out lights in the same spot as in 1935. Again conditions were excellent and good fortune favoured us. As soon as we lit up, the Hook-tips began arriving. Our captures totalled 13 males, though some were already past their best.

Since this date there has been little news of this insect and I doubt that many have been seen during the past ten years. I have been horrified to hear recently that the main portion of the forest of limes where we operated, has been felled, and hardly any of the bigger trees still stand. It is to be hoped that in spite of this depredation this rare moth may still survive and not find its way into our ever growing list of " lost " species.

26, Common Close,
Horsell;
May 1, 1948.

Second Brood Hamearis lucina.—From a batch of ova from Wiltshire parents, the larvae hatched May 21 to 25. By July 15 there were 40 pupae. A male butterfly emerged on July 28. The pupae were not in any way forced and, at present, none of the remaining pupae show any signs of hatching.—Major W. H. C. Carter; Glyn Cottage, Beaconsfield, Bucks, 29 July, 1948.

SUBURBAN LEPIDOPTERA.

By J. E. H. Blackie, M.A.

The scarcity of Lepidoptera in the neighbourhood of large towns is a familiar phenomenon, but perhaps one that would repay closer study than it has commonly received. Obviously the encroachments of roads, building and cultivation and the consequent disappearance of comparatively undisturbed land account for the extinction of very local species, of species requiring a specialized habitat or foodstuff which chance may remove and of species with a precarious foothold. But these encroachments hardly account for the general scarcity of butterflies and moths that is so regrettable a feature of the Wythenshawe area of south Manchester in which I have been living and observing since 1936.

At first sight the area seems admirably suited to Lepidoptera. Housing development began in the early '30's, before which it was mainly rural, with grazing farms, game-coverts, market gardens and an extensive private park as its main features. The housing development has been on modern and enlightened lines, and there are still many spinneys, undisturbed hedgerows and stream-sides, open fields, and a wealth of native and planted trees. I have identified over 300 species of flowering plant and over 70 species of bird in the neighbourhood.

In spite of this there is no species of butterfly or moth which could be described as common except the three whites, *Plusia gamma* late in the year, *Hapalia lutealis, Adela viridella* and *A. swammerdammella* and some of the Tineoidea. In all I have only detected 64 different species, and there are very few that one feels at all confident about seeing. One can beat bush after bush and put up nothing, explore a spinney and draw a total blank, walk in waste spots and feel lucky if a few *Crambus culmellus* fly up, and congratulate oneself if more than one Noctuid comes to light in the evening.

The following sample list of total absentees may give some notion of the state of affairs. All are described as being common or abundant in Day's *Lepidoptera of Cheshire* (1903) and the foodstuffs of all are plentiful: *Coenonympha pamphilus, Orgyia antiqua, Spilosoma lubricipeda, Triphaena comes, Leucania pallens, Ortholitha chenopodiata, Cabera exanthemata.*

The following have been recorded *once* only, and again all the food-plants are plentiful: *Callimorpha jacobaeae, Laothoë populi, Phalera bucephala, Phalaena typica, Euproctis similis, Opisthograptis luteolata, Opheroptera brumata, Hybernia marginaria, Hydriomena caeruleata, Dysstroma truncata, Euphyia bilineata, Iodis lactearia.*

Of the remainder it may be recorded that *Euchloë cardamines* appeared in small numbers in 1942–44 and has disappeared since, that *Polyommatus icarus* has become extinct, that *Deilephila elpenor* has appeared three times, that *Maniola jurtina* is present in very small numbers, that *Xanthorhoë fluctuata* shows some small sign of increasing, that *Notocelia rosaecolana* is the only *Tortrix* that has been at all frequently noted, and that *Odezia atrata* has one flourishing colony, a few yards from an arterial road.

Two explanations of this state of affairs occur to me:

(1) The area is very favourable to certain species of bird. It is of the type given by James Fisher (*Watching Birds*) as having the densest avian population, namely, 300 to the 10 acres. It provides cover, nesting-sites, certain foods and freedom from many natural enemies to a marked degree. The commonest species are the Rook, the House-sparrow, the Chaffinch, the Greenfinch, the Robin, the Hedge-sparrow, the Starling, the Great-tit, the Blue-tit, the Blackbird, the Song-thrush, the Missel-thrush and the Willow Warbler. All of these are given in the *Handbook of British Birds* as being eaters of the larvae of Lepidoptera, at least during the breeding season. If, as I suspect, the scarcity of Lepidoptera is a feature common to all such areas, the abundance of these particular birds seems to provide a probable explanation.

(2) The deposit of foreign matter in the atmosphere upon the area, though much lighter than it is a mile or two further north towards the centre of Manchester, is heavy enough to make the growth of many evergreens a matter of difficulty and to choke hairy-leaved plants, such as *Agrostemma* and *Androsace sarmentosa*, during the winter months. It is, furthermore, a cause of the somewhat premature decay and fall of leaves in the autumn. The effect on annual foliage is cumulative, and the drabness and flowerlessness of the country in the early autumn is always a subject of remark by visitors from more fortunate districts.

There appear thus to be two sets of conditions inimical to Lepidoptera, one operating most acutely in the spring and early summer, the other in the late summer and autumn. Together with the factors mentoned in the first paragraph of this article, they seem to be the reason for a scarcity in which the slight increase of *Xanthorhoë fluctuata* is a major entomological event.

17, Spinney Road,
Northenden, Manchester;
June, 1947.

Nymphalis polychloros in North Cornwall.—While walking along the cliffs about a mile north of Bude on the hot afternoon of July 27, 1948, I was surprised to see a very large and fresh *N. polychloros*, which, however, eluded capture.—A. H. H. Harbottle; "Kenwood," Valley Road, Bude, N. Cornwall.

THE GENETICS OF HABIT IN THE GENUS *COLIAS.*

BY E. B. FORD,
University Museum, Oxford;

AND

W. H. DOWDESWELL,
Science Department, Blundell's School, Tiverton.

EARLY in 1947, while staying at Princeton, N.J., and later at Ann Arbor, Michigan, one of us (E.B.F.) had the pleasure of discussing with Dr. W. Hovanitz the work he has recently been conducting on the genus *Colias*. This seems so important that, with his consent, we have decided to give a brief summary of it here. We have two reasons for doing so. First, the journal in which some of his most striking results have just been published is not readily accessible in Britain. Secondly, we wish to put on record a few data of our own which at least suggest that the discoveries he has made using an American species may be applicable to our own *Colias croceus* Fourcroy.

We, of course, wished to be certain that Dr. Hovanitz should have priority in announcing his own findings. Consequently, though aware of them for some time past, we have delayed this notice until his paper appeared.

Hovanitz has for a number of years been investigating the genetics and ecology of the North American *Colias eurytheme* Bd. In this, as in many other *Colias* species, the males are monomorphic and orange-coloured while the females are dimorphic; the commoner form being orange like the males while the rarer is whitish. This difference is controlled by a single pair of allelomorphs, the white phase being dominant and sex-controlled (Gerould, 1923; Hovanitz, 1944*b*). That is to say, though autosomal the gene exercises its effect in the females only, though transmitted equally by either sex. Apart from breeding tests, no means is known of distinguishing those males which carry the gene producing white coloration in the females. The alternative white, or pale, females of the *Colias* species are probably all determined genetically in this way, and they are known to be so in *C. croceus* (Ford, 1937) as well as in *C. eurytheme*.

Several years ago Hovanitz investigated the female dimorphism of *C. eurytheme* in varying environments and established that the pale form is relatively commoner in northern than in southern populations (1944 *a* and *c*), and at high than at low elevations (1945). It was to analyze these tendencies further that his more recent work has been directed. He has now (Hovanitz, 1948) shown that the gene concerned affects the habits as well as the colour of the females, making the pale form relatively the more active early in the day. If the times at which the specimens are caught be recorded, it is found that the frequency of the white phase is highest in the early morning and less towards noon; it may or may not rise again in the late afternoon. Moreover, the period for the most and the least diurnal activity of the white females is earlier in southern than in northern localities. On further examination it appears that both forms increase in diurnal activity as the morning advances, but that the white phase does so less than the orange, so altering the proportions in which the two are to be caught.

Such daily changes in the frequencies of the colour-phases must be related to variations in the physical features of the environment. Of these, solar radiation, temperature and relative humidity are likely to be the most important; the relative activity of the orange and white females varying with different combinations of these meteorological conditions.

The curve of relative frequency of the orange and white phases does not match that for the amount of solar radiation or of temperature alone. It does so fairly well in the morning, but not in the afternoon. There is, however, a fairly close association between the total activity of the females (the two phases together) and a combination of radiation and temperature, such that activity is greatest along a peak running from high temperature and low solar radiation to low temperature and high solar radiation. Activity declines as the conditions pass towards low solar radiation and low temperature and high solar radiation and high temperature. Since these environmental factors thus combine to affect total female activity, it is probable that they are important in influencing the differential behaviour of the orange and white phases. More extensive data may thus be capable of determining the precise environmental agencies which implement this genetic control of habit. In the localities where the work was conducted, relative humidity is so near to being inversely proportional to temperature that its effect on female activity, which may well be important, could not be discriminated.

During August, 1947, we were ourselves conducting ecological work on Tean, Isles of Scilly, and this necessitated a few days of previous study on the English mainland in the neighbourhood of Penzance. The exceptional abundance of *Colias croceus* at that time enabled us to make a few preliminary observations to determine if its two female forms differ in habit as they do in the American *C. eurytheme*. Unfortunately, owing to the exacting nature of the work upon which we were primarily engaged, it was impossible to catch sufficient numbers of *Colias* to decide the matter conclusively. Our data are summarized in the following table:

Time of day.	Orange ♀.	Pale ♀.	Total.
Up to 11 a.m.	21	13	34
After 5.30 p.m.	7	3	10
Early and late combined	28	16	44
Noon to 3.30 p.m.	20	4	24

Combining the results of the morning and evening captures, 36·4 ± 7·3 per cent. of the females were of the pale form, while in the middle of the day the percentage was 16·6 ± 7·5. The difference is 19·8 ± 10·5 which, being less than twice its standard error, cannot be judged significant. However, the departure is in the direction demonstrated by Hovanitz for *C. eurytheme*, and is at least fairly suggestive that the same situation may occur in *C. croceus*, though considerably larger numbers will be required to establish it in that species.

Dr. Hovanitz is to be congratulated on detecting a difference in habit which has escaped the notice of so many collectors. Moreover, it is of exceptional interest both for its evolutionary significance and from the fact that it is controlled by a single gene. Genetic differences in habit have been very little studied, especially in natural conditions. The *mima* and *wahlbergi* forms of *Hypolimnas dubius* Beauv. are unifactorial (Ford, 1937) and are said to differ from one another in their habits and methods of flight. But, although very possibly correct, such a statement is anecdotal only, and is unsupported by quantitative data. There are, of course, numerous instances in which a rare mutant has been reported more lethargic than the normal form, but this appears to be merely an indication of the disadvantageous effects usually associated with that condition, not a quality which can be fitted into the ecology of the organism.

It is evident that a difference in behaviour between two genetically controlled forms which are also distinguishable in colour or pattern might be responsible for adjusting whole populations of a species to the diverse conditions existing in the various parts of its range. This would produce distinct geographical races. Indeed Hovanitz has already detected a tendency in this direction in *Colias eurytheme* for, as previously mentioned, the proportions of the two female phases are different at high and low elevations and in northern and southern localities.

This work of Hovanitz has related the genetics of habit to the ecology of a wild form in a way which opens up new lines of enquiry. It throws fresh light on the evolution both of adaptations and of subspecific differences.

REFERENCES.

Ford, E. B. (1937), *Biol. Rev.*, **12** : 461–503.
Gerould, H. J. (1923), *Genetics*, **8** : 495–551.
Hovanitz, W. (1944*a*), *Ecology*, **25** : 45–60.
Idem (1944*b*), *Genetics*, **29** : 1–30 ; (1944*c*), *ibid.*, **29** : 31–60.
Idem (1945), *Caldasia* (*Bogota, Colombia*), **13** : 283–300.
Idem (1948), *Contr. Lab. Vert. Biol.* (*Ann Arbor, Mich.*), No. 41 : 1–37.

LYSANDRA CORIDON AB. OBSOLETA BRED.—As far as I am aware no account has been published about the results obtained by breeding from *obsoleta* forms of *Lysandra coridon*, so the following may be of interest. Early in August, 1946, I captured two *coridon* females var. *obsoleta*, i.e. with hind wings without spots and the fore wings with some spots missing. I had no knowledge about the male parents, one may have been var. *arcuata*. *Coridon* passes the winter in the egg state and owing to the thick growth of the food-plant, *Hippocrepis comosa*, it was not possible to estimate the number of ova deposited. Early in the following April there were signs that a number of larvae were feeding and by the middle of August a total of 103 butterflies had emerged, as follows : Typical 92 ; var. *arcuata* 2 ; var. *obsoleta* 9. The result of this breeding experiment is sufficient to show that this form of variation is hereditary and no doubt that by using the female and then inbreeding the progeny some genetical information of value would be obtained. *Coridon* is fairly easy to breed and pairs freely in confinement. To ensure success it is advisable to have the food-plant *Hippocrepis comosa* well established and in sufficient quantity to last from the egg to the pupal state.—S. SHEPHERD ; Herne Bay.

SPRING COLIAS HYALE IN KENT.—In the second week in June I commissioned three young entomologists to visit certain areas in Kent where *C. hyale* occurred in 1947, on my behalf and report to me the number of *C. hyale* on the wing, and of course to try and obtain females for breeding in captivity. They cycled down to the coast and toured the Kent countryside following carefully drawn maps showing where I had seen this species the previous autumn. Only one day was given up to this particular species, during a week-end away, but R. Henderson took a female, and his friend, M. Gloster, caught three perfect males. The third boy, P. Andrews, chased several *C. hyale*, but did not actually make a capture. Several more were seen, single specimens almost certainly males, but as most of the lucerne had been cut the boys felt that the majority of the caterpillars that had undoubtedly pupated in these fields had been destroyed. The female they brought back alive laid well on young seedling lucerne that I had planted last autumn for just such an eventuality. I have now sufficient ova to make certain of carrying on *C. hyale* for at least one more generation, and I intend to try and hibernate a percentage this coming winter. —L. HUGH NEWMAN ; "The Butterfly Farm," Bexley, Kent.

SOME GEOGRAPHICAL NOTES ON WEST CHINA LOCALITIES.

By K. J. Fisher (Mrs. Richardson),
Assistant Professor of Entomology,
University of Nanking.

(Concluded from p. 195).

Very small places are particularly bad as names for localities. Little hamlets or groups of farms, although they may seem stable enough, and perhaps boast a poetic title, may disappear completely in the course of a few years, burnt down and rebuilt under a new name, dispersed by bandits, depopulated by warlords, or just abandoned when trade or shifting cultivation sends the population elsewhere.

A few words which recur again and again are worth noting: *Shan* means mountain; note Omeishan, the mountain, and Omeihsien, the county town at its foot. *Kiang* and *Ho* both mean river, the former word usually referring to a larger one; *chwan* means a smaller river or even stream. Szechwan is the province of the Four Streams, *szu chwan*. *Kiao* means a bridge. A note on pronunciation: In the Post Office romanization, K is pronounced like ch or j; i.e. Yangtze Jiang. *Lou* or *lu* means road.

The Identification of Collectors' Localities in West China.

My method in making the following notes has been to go through the butterflies in the British Museum (Natural History), making a list of the localities given on the labels. Most of these localities were readily identified on one or more of the following maps, and they need not be referred to further. The maps used were: The War Office 1:4 million Map of China (2nd ed., London, 1939), and other maps in books by Pratt (1892), Leech (1892), Davies (1909).

A certain number of names could not be identified so easily, and an account of them follows. To begin with, I repeated them over and over in various ways, as an Englishman might pronounce them, as a Frenchman might, and so on, trying to guess at the Chinese word indicated. When I thought I had got it, I looked it up in the Post Office List, often under several spellings.

I would be the first to admit that much of this has been the most flagrant guesswork, but one or two accidents have enabled me to check some of my guesses as correct, and I do not think many of them are very wide of the mark. Sometimes, as where there are two or three small towns of the same name, the reader will have to decide for himself which is the most likely to be correct in an individual case. I have tried to put in altitudes in these cases (taken from Davies [1909]), as these, with a knowledge of the species found, may give a clue.

In the following list I have put the locality taken from labels first; the supposed actual place, spelt according to the Post Office list, is printed in capitals. Where I could not find the place in the P.O. List, I have followed the War Office map for spelling. Names of provinces: Sze. = Szechwan, Yun. = Yunnan, Si. = Sikang. I have not a recent enough map or P.O. List to be certain of all the Sikang names; there may be errors here, but they are not so important.

Aneanba.—A Tibetan hamlet on a tributary of the Yalung, between the Gi La and Yingkuanchai.

Atenze, ATUNZE Si.—On the hills above the Mekong, north of Tseku, but on the east side of the river.

Batang, Bathang, PAANHS.—On the Ba Chu, a tributary of the Upper Yangtze.

Bathang.—*See* Batang.

The Chengtu Plain.—An old piedmont plain, built up of the silt from the Min and other rivers flowing out of the mountain gorges into the Red Basin. Although almost flat to the eye, the plain slopes gently from west to east. It is about 50 miles by 40, and is well-irrigated, with almost every inch cultivated. Chengtu, capital city of Szechwan Province, lies on the plain, at an altitude of about 1500 ft.

Chetou.—*See* Jeddo.

Chiama Ngu Chu—*See* Lükiang.

" Chientzaw in the valley of the Loma River."—I have not been able to find Chientzaw, but have put the Loma River (tributary of the Mekong) on the map.

Chinfosan.—*See* Chingfushan.

Chingfushan or Chinfosan.—? KINGFUHSIEN, S. of Suifu, Sze.

Da Chu.—*See* Loutzekiang.

Garthok.—*See* Gartok.

Gartok, Garthok, Kiangka, Markam or Ningching.—A trading town with many names, and no post office. South-west of Paan.

Hokou, Howkow, HOKOW.—There are several towns of this name, which means River (or River-Gorge) Mouth. Leech's Hokou is that on the Yalung River on the Kangting-Paan Road, at about 9000 ft. The second Hokow is on the Yunnan-Kweichow border south-west of Weining, about 4500 ft. The third is a small place on the big road from Chengtu to Kunming, near its crossing over the Yangtse above Tungchuan. Alt. about 6000 ft.

Hotzepo.—A small village at the foot of Pailuting.

Howkow.—*See* Hokou.

Hsinkaiszu.—Another summer station for missionaries at 4000 ft. in the foothills of Mount Omei.

Huangmuchang.—On a small road from Kiating to Tsingkihsien.

Huangnipo.—*See* Huang-ngyi-po.

Huang-ngyi-po, Huangnipo.—A village on the Talu between Yaan and Tsingkihsien.

"Hweitsch : Yunchuan."—I have not been able to find "Hweitsch," but there is a YUNGCHWAN Sze., roughly 105° 50′ E., 29° 20′ N.

J-Chang = Ichang.

Jeddo, Chetou.—A small hamlet of Tibetans and some Chinese settlers at 11,300 ft. a short day's march from Kanting. Above it is an important pass on the Lhassa road, variously called the Gi, Je, or Jeddo La [La = Tibetan] pass). Alt. about 16,000 ft.

Jungling.—? YUNGNING, Si., north of the big bend of the Yangtze, about 103° 40′ E., at 9000 ft. On a multiple cross-roads of mountain tracks, near a Buddhist monastery. There is another Yungning south-east of Suifu, on the Liuchow-Weining Road at about 3000 ft. Towns with *Yung-* are often spelt *Jung-* on old maps ; *-ling* and *-ning* are indistinguishable to most Chinese.

Kiangka.—*See* Gartok.

KIANGKOW ?—*See* Tchangkou.

Kiaoshui-tsun.—*See* Kiau Chuy.

Kiau Chuy.—? Kiaoshui-tsun, Yun., at 104° 22′ E., 26° 08′ N., east of Suanwei.

Kin Sha Kiang, the Chinese name, and Dre Chu, the Tibetan name of the Upper Yangtze.—The Chinese name means "Golden Sand River" on account of the gold that is found there.

Kiong Tscheou, KIUNGCHOW, Si.—Near Yaan, also called Kiunglaihs.

Kuanhsien, KWANHSIEN, Sze.—A pretty town, famous for the intake of the irrigation system of the Chengtu Plain. North-west of Chengtu, where the Min River comes out of the mountains, at about 2000 ft.

Lan Tsang Kiang.—*See* Loutzekiang.

Leoufang.—? Lufenghs., Yun., west of Kunming.

Litien.—On W.O. map ; a small town in the mountains E. of Weisi.

Loutzekiang, Lan Tsang Kiang, or Da Chu, names for the upper part of the Mekong.—Loutzekiang applies particularly to the part around Tseku, Atunze, etc., probably from the Loutze or Lotze people who inhabit that region.

? Lufenghs.—*See* Leoufang.

Luking, Chinese, or Chiama Ngu Chu, Tibetan.—Names of the Upper Salween.

Lungchi.—A lake in the mountains above Nan Yo Miao. About 6000 ft.

Lungchih.—A small town on a tributary of the Min, about 12 miles west of Kwanhsien.

Maenia.—The nearest I have been able to find to this is Mei-li, called Mi-li on the W.O. map, at 9500 ft., near the Litang River, north of Yungning, Si.

Markam.—*See* Gartok.

Momien.—*See* Tengyuehting.

Mong Myen.—*See* Tengyuehting.

Mosimien Pass.—South of Kanting, on the road to Mosimien, in the mountains west of the Tung River.

Nan Yo Miao.—A farming community three miles above Lung Chih.

Nianschan, LIENSHAN, Sze.—Is near Chengtu, but the name suggests some of the German parties who explored further north, in Kansu.

Ninching.—*See* Gartok.

Ningyüanfu, NINGYUANHS, Si., also called Sichanghs.—A big town on the main north-south route of W. China, from Chengtu to Kunming.

Ouase = Wasze.

Pailuting.—A mountain in PENGHSIEN, to the north of Chengtu. 6000 ft. There is a small summer settlement here where missionaries from Chengtu spend their holidays. Also spelt Pehluting.

Paiyentsing Yun.—Near Tsuyung.

Patsefang.—*See* Putzefong.

Poshö.—This has a Tibetan ring, but I have not been able to find it. There is a POSI, Yun., north of Kaiyuan (Amichow) on the Hanoi-Kunming Railway, which is spelt Pohsi on Davies' map, and there is a Posen just over the Yunnan border, in Kwangsi, whose name is seldom pronounced the same twice running.

Putzefong or Patsefang.—On Mosimien Pass.

The Rainscreen Mountains.—This is a modern name, coming into use to describe ranges such as those west of Yaan, which stop the monsoon and cut off valleys like the Tung. The eastern side is very wet, clothed with dripping rain-forest, and not cultivated much above five or six thousand feet. The peaks run up to 14,000 or 15,000 ft., the passes are about 10,000 ft., and both are almost continuously crowned with cloud. Once over the passes the clouds break up, to re-form on the other side of the valley, leaving a long strip of blue sky between. Beneath, the valley is unusually dry, with such plants as Opuntia, Datura, etc.—quite a different flora and fauna from the eastern side. Cultivation goes much higher on the western side, and there is little forest, but much grass and scrub. The Tung River runs at about 5000 ft., and the valley is hot, with irrigated rice at the bottom. Other similar stretches of dry country are found in most of the north-and-south valleys of West China.

The Red Basin.—Another modern term, describing the comparatively low-lying area of central and eastern Szechwan, which is surrounded by mountains, and decidedly basin-like in shape. The rock formations are largely red and purple-red sandstones and shales in low shapeless hills or anti-clinal ridges, and give the landscape its prevailing red colour.

Siao Lu means "Little Road," and is the shortest way from Yaan (Yachow) to Kanting (Tachienlu). Distance about 150 miles. The road runs up the Ya River gorges and then crosses low hills to the pretty basin of Tienchuan. Rejoining the river, it climbs through more gorges to Liangloukow, where there is a fork. One branch passes over the Rainscreen Mountains at Ma-anshan; this is the shortest pass (10,000 ft.), but very steep. The other branch, followed by the motor road, goes over the Erlangshan, with landslides every half mile in the rainy season, and down into the Tung Valley at Lutingkiao. Here it joins the Talu, and soon the Maanshan branch, going on the Waszekow, where it turns west up the Kanting River to Tachienlu.

Siao Weisi.—Is further north, and on the Mekong. Spelt Siaou Ouisi by the R.C. Missionaries.

Ta Ho, or Ta Kiang.—Names given to the Yangtze below Suifu.

Ta Kiang.—*See* Ta Ho.

Talu: The "Big Road."—A longer route from Yaan to Kangting, but it crosses easier passes and is passable for horse-traffic. This is the road illustrated in Pratt's (1892) map, which gives the names of sixteen small towns and villages on it, and to which I commend the reader for details. It goes south from Yaan to Tsingkihsien (Pratt: Chingchihs) and through Nitou.

Tapintze.—There is a small place called Tapin in Yunnan, N. of Tali, at 100° 14′ E., 26° 17′ N. But *Ta pin-tze* means "a flat place," and might refer to almost any river flat in mountain country.

Tatongkiao.—There is an important bridge—*kiao*—over the Tatung River to the north-west of Lanchow in Kansu.

Tatu Ho.—*See* Tay Tou Ho.

Tay Tou Ho.—An old name for the Tung River. Also written Tatu Ho.

Tchangkou, perhaps Tsangu? or perhaps KIANGKOW.—This name also means River Mouth or River Gorge Mouth, and is a common name all over China. There are two Kiangkows in eastern Szechwan, and one in western Szechwan, near Meihsien, south of Chengtu. Alt., about 1300 ft.

Tengchunghs.—*See* Tengyuehting.

Tengyuehting, TENGYUEHHS (Tengchunghs.) Yun., is a fair-sized town near the Burma border. Also called Mong Myen by the Shans and Momien by the Burmese.

Tsangku.—? Tsangu, Si., on the Yalung River, north of Hokow.

Tsangpo.—Tibetan name for the Upper Brahmaputra River.

Tsangu?—*See* Tchangkou.

Tsangu.—*See* Tsangku.

Tsekou, Tseku on the W.O. Map.—N. of Siao Weisi on the Mekong.

Tsienfochang, CHIENFUCHANG, Sze.—Near Kiating.

Tze Shih Kuan.—A small village on the Siaolu in the Ya gorge above Tienchuan.

Wassukou, WASZEKOW, Si.—A small town on the Kangting River, just above its junction with the Tung. As so many of Oberthür's and Leech's specimens came from here, it is worth describing in detail. The valley floor is very warm and sheltered; a little above the Tung River it is not quite so dry, and there is forest above. The town lies at an altitude of about 5300 ft., but the mountains close by run up to 15,000 ft. or so, and behind them can be seen the Tachienlu peaks with perpetual snow. High up are Tibetan settlements, with small barley fields and the grasslands where they raise cattle, and it is obvious that many species labelled "Wassu" must have come from these heights. In the warm valley may be seen many *Papilios*, *Bhutanitis*, and the larger *Argynnis*. This almost sub-tropical association continues a long way up the valley towards Kangting, and some specimens from it have been labelled Tachienlu, although by the time the town itself is reached, a much more temperate fauna is found. I have taken *Parnassius imperator* within a mile of the town. As the French missionaries sometimes referred Waszekow to Tibet, some of the effects on our ideas of distribution are not surprising.

Weisi, WEISIHSIEN Si.—East of the Upper Mekong.

Wuinkin.—? YUINKANGHS, Yun. S. of Paoshanhs. (Yungchang), on the Burma Road. This looks far-fetched, but in W. China the character "*Yung*" is often pronounced "ewin" or "yuin," with the w-sound stressed; the second character might well be written "kin" by a Frenchman.

Wutungkiao.—A small town on the Min River a few miles below Kiating.

Wychang, ? Ichang.

Yakala.—*See* Yerkalo.

Yaregong, Yaragong.—On Davies' Map, a tiny hamlet near a Buddhist monastery, at about 11,900 ft. in the mountains south-east of Paan (Batang).

Yatang.—*See* Yutang.

Yatscheou = Yachow or YAAN.

Yerkalo, Yakala on the W.O. map, YENTSING Si., north of Atunze.—There is an R.C. Mission here.

The Yunnan Plateau.—This is not a flat plateau, but a very much dissected one, cut up by erosion and faulting into numerous small limestone basins, often with subterranean drainage. It is further cut across by the deep valleys that have eaten their way down through the rock, and may be far below the general level of the Plateau. In the south-eastern part of the Province the altitude of the basins is somewhere between 6000 and 8000 ft. Some of the larger basins contain lakes and quite extensive plains; such is the basin in which Kunming, the capital, is built. Yunnan is much drier than Szechuan because of its sunnier climate, and cooler, because of altitude. The climate is enthusiastically described by the inhabitants as "four seasons, all spring." The basin floors are cultivated; the hills between are very rocky and eroded, with some scrub; most of the trees are cut down or burnt off. To the west the country gets constantly more and more rugged, until the land of the great rivers is reached. Here the Salween, Mekong and Yangtze run close together in deep valleys, with enormous chains of mountains between them.

Yutang.—*See* Yutong.

Yutong.—A difficult name to fix on a definite spot, but on a sketch map of Edgar's it is placed vaguely in the rainscreen mountains, to the south of Moupin. Variously spelt Yutang, Yatang, etc.

BIBLIOGRAPHY.

Pratt, A. E. (1892), *To the Snows of Tibet through China.* London. Map.

Leech, J. H. (1892), *Butterflies of China, Japan and Korea.* London.

Davies, H. R. (1909), *Yunnan.* Cambridge. Map.

The Ministry of Communications, China (1923), *List of Post Offices*, 11th issue, Shanghai.

Launay, A., *Histoire de la Mission du Thibet.* Paris.

Teichman, E. (1922), *Travels of a Consular Officer in Eastern Tibet.* London. Maps.

Oberthür, Charles, *Études de Lepidopterologie Comparée.* Vols. I to XXII. Rennes.

NOTES AND OBSERVATIONS.

Cross-pairing of Maniola tithonus and Aphantopus hyperantus.—On the afternoon of July 28, 1948, whilst watching butterflies near my house, I saw a male *M. tithonus* and a female *A. hyperantus in cop.* flying, as a pair, to and fro between the branches of a hazel bush. The pair settled on a leaf just above my eye level and I watched them for several minutes. The female was carrying the male. I attempted to box the pair as it rested, but the jarring of the branch frightened the butterflies which separated and flew off. A hundred yards further on, I saw another male *tithonus* pursuing a female *hyperantus.* He whirled round her, buffeting her with his wings. The pair revolved in a courtship flight which, however, was here not followed by copulation. *Hyperantus* has been out here for about a fortnight, but *tithonus* began to appear three days ago with the onset of hot sunny weather, the males being the first out, as is apparently the case with most butterflies, satyrids and others. On the common I counted forty *tithonus* males and only three females. Of the latter one was flying *in cop.* with a male of her species. *Hyperantus* males and females are abundant and still fresh. *M. jurtina* is common, flying in the same stretch of common land, but it was to be observed that male *tithonus* took no notice of the female *jurtina* flying near them. —Vere Temple; King's Chase, Tollard Royal, Salisbury.

Aglais urticae Courting Nymphalis io.—I have already reported (*Entom.*, **81** : 20) a mixed pairing observed on September 6, 1947, between *Colias hyale* and *Colias croceus* ab. *pallida*, with another apparent attempt at pairing between the same species on the same day. On April 11, 1948, I observed a persistent courtship of a female *Nymphalis io* by a male *Aglais urticae*. I first observed the *io* feeding on a flowery bank, with the *urticae* in very close proximity. On further investigation I saw that the *urticae* was from time to time drumming with his antennae on the hind wings of the *io*. Every time the latter flew to a fresh flower the *urticae* followed, but was almost completely ignored. I was too intent on watching the insects to observe the time, but I should think these proceedings continued for upwards of five minutes. Then another *urticae*, presumably also a male, intervened, and the two *urticae* flew off fluttering violently together; the *io* continued feeding unconcernedly. In the confusion I was unable to follow which was the original male, but presently one flew down and started paying attention to a female *urticae* which was feeding some 18 in. from the *io*. After a few seconds, however, the *io* fluttered, and the male *urticae* at once returned to her. He continued with her for about another minute, and then she flew off, he following close behind. When the insects were lost to sight at the other side of the clearing, probably 50 yards away, the *urticae* was still in hot pursuit.—M. J. Goddard; East Ilsley, Newbury, Berks.

Further Notes on Colias hyale Wintering in Kent.—I visited the *C. hyale* field again on May 30 with Mr. I. Lansbury, in the hope of finding out exactly how many of this species there were. In about a quarter of an hour we saw a fine male zig-zagging across the field in the characteristic way, and I disturbed a female with limp wings from a clump of lucerne. This specimen was later found to have far less black on the hind wings than any taken in the same area last year. At this point we were turned out of the lucerne field by an angry farmer, and consequently observations had to be discontinued for the day. A period of dull and mainly wet weather followed, and when we next visited the field we found that the lucerne had been cut. However, we were still very hopeful as *C. hyale* were known to have hatched in a neighbouring field after the lucerne had been cut last autumn. The chance of a second brood has now gone, I think, for on July 20 we found that the field had been ploughed and all that remained were a flock of Lesser Black-backed Gulls feeding probably on worms. There are many odd plants of lucerne and clover growing in this area and it is possible that ova were deposited on them—but I think not. I am, however, absolutely certain that there were far more *C. hyale* than we actually saw, but the weather was bad on many of our visits and nothing was seen. None of those seen this year, or any of the 48 actually caught last year, belonged to the recently recognized species *Colias alfacariensis*.—D. F. Owen; 3, Liockmead Road, Lewisham, S.E. 13.

OFFER OF LIVE COLIAS CROCEUS AB. PALLIDA.—On June 13, whilst chasing a male *hyale* over lucerne in Dartford Rural, I disturbed a female *croceus* ab. *pallida* in perfect condition. This insect laid nearly 200 eggs readily on lucerne and they hatched in 10 days. Being on cut food they sustained a percentage of loses, but I have to date 70 young larvae doing well on pot grown lucerne, and an unknown number still on cuttings. I should like to express my willingness to assist any *bona fide* requests to provide live virgin ab. *pallida* for any experimental purposes, such as the possibility of a *croceus* ab. *pallida* × ♂ *hyale* pairing, such as mentioned by M. J. Goddard (*Entom.*, **81** : 20).—CLAUDE F. RIVERS; Heatherbank, 250, Shepherds Lane, Dartford, 17 July, 1948.

PARARGE AEGERIA LINN. IN KENT.—A specimen of this species was seen flying past my home at Sevenoaks, Kent, during the summer last year. On checking the records of this insect I gathered that this butterfly had not been seen in Kent for a number of years, and came to the conclusion that my specimen was a case of mistaken identity. On April 19 last I again saw a specimen in the same road. The same day I searched the neighbourhood thoroughly for others, but was unsuccessful. On May 8, however, in the company of Mr. F. T. Vallins, we found a small but thriving colony in the woods near Ide Hill, some three and a half miles away from the house. From these observations it would appear that *aegeria*, like *Nymphalis polychloros*, is on the increase and is extending its range.—T. G. HOWARTH, B.E.M., F.R.E.S.; 66, St. John's Road, Sevenoaks, Kent.

JASPIDIA DECEPTORIA—A SPECIES NEW TO BRITAIN.—On the morning of June 14 at 1.20 a.m. an unfamiliar moth appeared at light in a Kentish wood. An examination of Culot showed it to be a specimen of the above species. It flew straight into my petrol lantern which had a broken glass, but fortunately did not damage itself appreciably. Like its cousin *J. fasciana* it inhabits woods and the larva feeds on grasses. There seems no reason why it should not be established in its locality. According to Seitz it occurs in most countries of Europe, except Britain and Holland.—AUSTIN RICHARDSON; Beaudesert Park, Minchinhampton, Glos.

ARENOSTOLA FLUXA HB. ON THE SUFFOLK COAST.—On July 24, a very mild evening, while collecting on the sandhills just to the north of Lowestoft, I was surprised to spot on a marram head a fresh female of *Arenostola fluxa*, a very unusual site for this species, which is as a rule associated with damp areas in woods and fens where its food-plant, *Calamagrostis epigeios*, abounds. Mr. P. J. Burton, who was with me, said that he did not then know of a previous record for the eastern area of Suffolk. Barrett (**5** : 109) mentions Yarmouth, as a locality, just over the border in Norfolk. It is possible it may have migrated from some marshy areas a little way inland.—C. G. M. DE WORMS; 26, Common Close, Horsell, August 4, 1948.

CHIASMIA CLATHRATA IN NOTTS.—On May 14, 1948, I came across a specimen of *C. clathrata* in a little grass-sided lane here at Upton, Notts. This was the first time I had seen it or taken it in Notts.

I went again on May 17 and got two more, one male and one female. Mr. A. Simmonds and I went again on May 21 and we found about a dozen. On the same night I saw a specimen on the roadside when going to Southwell from Upton, and also saw one in my meadow down by the River Trent at Upton. So it seems fairly well all over Upton parish.—A. S. B. F. P. WYNNE ; Upton House, Upton, near Newark, Notts.

[The species is recorded as "local and rare" in Carr's *Invert. Fauna, Notts, Supplement.*—ED.]

PSODOS CORACINA AND NYCTEROSEA OBSTIPATA.—A few larvae of *P. coracina* were obtained from ova laid by a moth taken in Perthshire last July. By forcing during the winter three of them were induced to complete their growth and spin by the early part of May. The first moth emerged on May 26. The remaining larvae are still feeding and it seems improbable that they will pupate this year as they grow extremely slowly and presumably the species normally spends two years in the larval stage. The distribution of *N. obstipata* extended as far north as Northumberland last year as a moth came to light at Riding Mill on October 24. —F. W. GARDNER ; "Sherwood," Riding Mill, Northumberland.

AN APPEAL.—Since 1923 Monsieur Léon Lhomme and his collaborators have been engaged on the compilation of a *Catalogue of the Lepidoptera of France and Belgium.* The work has now reached page 648, No. 3110 *Compsolechia subsequella* Hb., and only two fascicules remain to be published to complete this important work, which is indispendable to all students of the Lepidoptera, even to those who may never travel beyond these islands. But the cost of printing in France has suddenly increased more than double so that it is financially impossible for the author and publisher, now over 80, to complete it without help. It is hard to believe that there are only eight subscribers in Great Britain, but such is the fact. Surely there are many more interested in this very valuable work and willing to subscribe to the Microlepidoptera part of the Catalogue, which at the present rate of exchange is still quite cheap. The present cost of each fascicule of 16 pages is 50 francs, and all the remaining parts are ready for publication. Vol. I (Macros) can still be purchased from the author and publisher at 500 francs ; Vol. II (fasc. 1, 2 and 3) at 400 francs ; and fasc. 4 at 300 francs, from Monsieur Léon Lhomme, le Carriol, par Douelle, Lot. It is necessary to order the work or parts, and to get permission from the British authorities to send money abroad, which is readily granted on production of the invoice. The writer will be pleased to answer any enquiries.—WM. FASSNIDGE ; 4, Bassett Crescent West, Southampton.

DICTYOPLOCA SIMLA WESTWOOD (LEP. SATURNIIDAE), WITH SPECIAL REFERENCE TO SSP. JAINTIENSIS WATSON.—The above subspecies was described by J. H. Watson in 1927 (*Entomologist*, **60** : 36), the locality being given as the Jaintia Hills and probably other districts of Assam, and it was distinguished from the typical subspecies by "its generally richer, redder chestnut colour instead of the brown-chestnut of the type ; by the more pronounced whiter apex of the fore wing ; by the paler pink area between the basal black line and the ocellus of the hind wing and by the more pronounced dark serrated submarginal line of the fore wing in both sexes." I have recently examined a short selected series bred from cocoons found in Shillong in August, 1938, which emerged in Calcutta in November and December of the same year. These, from their locality, should belong to the above subspecies, but, whilst having the more pronounced dark serrate double line, they certainly lack the more extended and whiter apex of the fore wing which is shown very clearly in the figure which accompanies the description. It appears likely, therefore, that *jaintiensis* is confined to the Jaintia Hills, as it is unlikely to occur in other parts of Assam and be absent from Shillong. In August, 1938, the cocoons of *simla* were common, the majority being found in the neighbourhood of bushes of *Lagerstroemia indica* (Lythraceae). In May, 1941, I found a few larvae on an unidentified shrub belonging to the Lauraceae. With them was another, very similar larva, presumably of *Dictyoploca cachara* Moore, which differed in being without the conspicuous blue spiracular blotches and in having the hairs of one side brushed forward and of the other back, in the same way, as those of the European *Acronycta leporina* L. This latter larva which was considerably the more common, spun a cocoon with a much closer mesh than that of *simla*, but the pupae failed to survive the transfer to Calcutta and I was unable to identify the species for certain.—D. G. SEVASTOPULO, F.R.E.S. ; London, February 22, 1948.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*April* 28, 1948.—The President, Col. P. A. Cardew, in the Chair. *Exhibits :* Mr. L. T. Ford, a gall made on a larch twig by the larva of *Enarmonia zebeana* Ratzeburg ; Mr. C. N. Hawkins, *Laspeyria flexula*, a larva which he had fed through the winter on alga growing on sticks, and *Phyllotreta nigripes* (Col.), abundant on wallflowers ; Mr. W. J. Finnigan, *Alispa angustella* from larva collected at Mickleham, Surrey, October, 1947, young larvae of *Polychrisia moneta*, and a cocoon of *Sphecia bembeciformis* ; Mr. E. H. Wild, *Biston strataria* ab. *robinearia*, *Erannis progemmaria* ab. *fuscata* and an intermediate, *Orthosia munda* abs. *pallida* and *immaculata*, and also a form with complete rows of wedges on the submarginal lines, all from Croydon, Surrey ; Baron de Worms, *Arctia villica* larva from Canvey Island, Essex, *Lampra fimbria* from Surrey, and *Euproctis chrysorrhoea* from Canvey Island, Essex, where it was this year exceedingly abundant ; Mr. W. H. Forster, series of *Pterostichus angustatus* (Col.), and *Oecoeptoma thoracicum* (Col.) from Ongar Park Wood, Essex, April 18, 1948 ; Mr. H. E. Webb, *Pieris napi* var. *hibernica*, two strongly banded specimens ; Mr. R. Tubbs (i) *Limenitis camilla* pupa (pupated April 25), and a larva (after third moult) both taken in their hibernacula near Midhurst, Sussex, January 25, 1948, also *Lycaena phlaeas* pupae (pupated, April 3 to 24), taken in hibernation, Tunbridge Wells, Kent, January 17, 1948 ; Mr. T. G. Howarth, *Apatura iris* larvae in third instar, and larvae of *Hemithea strigata*; Mr. T. R. Eagles, *Endromis versicolora*, young larvae from Aviemore, Inverness; Dr. G. V. Bull, *Bombylius major* (Dipt.). It was reported that *Colias croceus* had been seen in the Isle of Wight (April 18, 1948), near Eastbourne, Sussex (April 25) and at Bookham Common, Surrey (April 27). The earliness of the season was shown by the dates of first appearances of many insects, for example, the following butterflies: *Pararge aegeria*, March 25; *P. megera*, April 25; *Argynnis euphrosyne*, April 19; *Hamearis lucina*, April 25; *Pieris brassicae*, April 18; *P. rapae*, March 26; *P. napi*, March 27; *Euchloë cardamines*, April 11; *Pyrgus malvae*. April 19.

May 26, 1948.—Mr. J. O. T. Howarth, M.A. (Vice-President), in the Chair. The death of Dr. A. Steven Corbet was reported. *New Members:* Messrs. A. H. Sculthorp, V. Bascombe, L.D.S., R.C.S.Eng., A. E. Richardson and T. A. Lloyd, F.R.E.S. *Exhibits:* The Chairman, *Eriogaster lanestris* forms from Cambridge, Ramsey, Hunts, and Wimborne, Dorset; Mr. R. F. Haynes, larvae of the same species from Chiddingfold, Surrey; Mr. A. S. Wheeler, *Nymphalis polychloros*, a female taken April 11, 1948, in Ashdown Forest, Sussex, by which about 150 eggs were laid on sallow and some of the resulting larvae were exhibited; Mr. L. S. Whicher, *Copris lunaris* (Col.), four males and four females taken May 18, 1948, near Dorking, Surrey; Mr. G. H. B. Oliver, *Trichiura crataegi*, larvae of two distinct forms occurring in the same brood; Mr. P. Russell, *Hypocrita jacobaeae* ab. *grisescens* taken May 9, 1948, in South London; Mr. W. J. Finnigan, *Poecilocampa populi* larvae, *Anaclypticus mysticus* (Col.), and *Athorus villosus* (Col.), all from Bookham, Surrey; Mr. C. N. Hawkins, *Cicindela campestris* (Col.), an asymmetrical specimen with no central white spot on the right elytron and all the lateral spots very much reduced, Minehead, Somerset, May 5, 1948; Mr. H. W. Forster, *Phytoecia cylindrica* (Col.), *Gracilia minuta* (Col.), bred from bramble twigs, and *Elater sanguinolentus* (Col.), a specimen with the elytra a dirty pink colour, all from Epping Forest, Essex; Mr. A. E. Gardner, *Sciapteron tabaniformis* larvae, pupae, and imagines, taken as larvae in April, 1945, at Meharicourt, France, in young poplars planted by the Germans round an airfield, and *Pararge aegeria* larvae from Bookham, Surrey; Mr. T. R. Eagles, *Philereme transversata* larvae of both the green and the dark form taken at the Box Hill Field Meeting, May 23, 1948, also *Cleora lichenaria* taken at the same time. Mr. W. H. Spreadbury said that the eggs of *Nymphalis io* have mostly 10 ribs; some had 9 and only a few had 8, the number given in some books. Dr. H. B. D. Kettlewell reported that *Euphydryas aurinia* was increasing in its area near Cranleigh, Surrey. Mr. A. S. Wheeler had taken *Pieris napi* ab. *flava* Kane near Yarmouth, Norfolk, May 15, 1948.—T. R. EAGLES, *Editor*, 32, Abbey Road, Enfield, Middlesex, May 4, 1948.

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SOME NOTABLE VISITORS TO LIGHT AT SWANAGE IN 1947.

By ARCHIBALD G. B. RUSSELL, C.V.O., F.S.A., F.R.E.S.

IT was not until late July that I was able to devote time to collecting last year. Since then visitors to light were numerically far below normal. It is likely that many of our English species were depleted by the heavy rains of the previous autumn. But though numbers were small, there were noteworthy features, more particularly among moths of immigrant origin, which, favoured by the wonderful summer, were enabled to get through a British-born brood. It is indeed surprising, in view of the exceptional conditions, that apart from the phenomenal prevalence of *Rhodometra sacraria*, the year does not seem to have been a remarkable one as far as moths are concerned in other areas. The rare captures at my light-trap are probably to be accounted for by the fact of its standing high in a central position on the south coast and in the near neighbourhood of a lighthouse, by which straying insects would be drawn into the district. The following are among the more interesting occurrences.

The earliest in date and one of the most unexpected of these was a male *Emmelia trabealis* in fine condition. At about 11.30 p.m. on July 28 I was sitting with a brother collector, Mr. H. E. Chipperfield, in the dining room at my house with the door open on to the terrace when the moth flew in, circled round the light and settled upon the table. It may be conjectured that the insect or its parents had migrated from France, as it is unlikely to have derived from the British home of the species in the Breck Sand locality. The only parallels that I know of are a specimen mentioned by South as having been found many years ago on a gas lamp at Exeter, and one in the British Museum presented by Major Blackiston and labelled “ S. Wales, 1889. H. W. Vivian.” It is worthy of note that the food-plant of the larva, *Convolvulus arvensis*, was in troublesome abundance in my grounds last year.

On August 3 a *Cosymbiac* ame to my light-trap, which I took to be *C. pupillaria* Hübner, an identification which was subsequently confirmed at the British Museum. The specimen, which is a fresh male, closely resembles the typical form as figuredi n Seitz’s

Geometrae, pl. 4, O., save that the ocelli on the fore wings are so much reduced in size as to be well nigh invisible. It will be remembered that a female of this species was taken by Dr. K. G. Blair at Freshwater on October 22 of the previous year, and recorded by him in *The Entomologist's Monthly Magazine* (1947, **83** : 29), where he mentions old specimens from Scilly in Dr. Cockayne's collection, which seem to be the only other British examples at present known.

On the night of August 16, at 11.45 p.m., I found a *Plusia* hanging upside down on a wire outside my light-trap, in a manner I have often noted in the case of *P. interrogationis*. The fact that the fore wings were richly marbled with pink and grey made me uncertain as to its identity. It was later determined at the British Museum as an exceptionally fresh and finely tinted example of *Plusia ni*. Specimens taken in this country are usually worn and faded. The conspicuous pink markings seem indeed to present an uncommon feature, as no such form is mentioned by Seitz. On September 28 another specimen of much darker complexion came to my light. I had once previously taken the species on August 23, 1936, at flowers of Veronica just outside my house. Mr. Parkinson Curtis, in his Dorset List, cites only four previous records for the county. The majority of the remaining known British specimens derive from Cornwall. The capture of a *Plusia* new to Britain, *Plusia limbirena* Guenee at my light-trap on the night of September 13 has already been chronicled in a recent number of *The Entomologist*.

On August 15 a superb *Cossus cossus*, a very brightly tinted, silvery specimen, settled on the roof near my light-trap; and on August 17 I had a single *Hydraecia petasitis*, the latter species new to the Dorset list.

On September 2, 3, 13 and 18 respectively I had at my light-trap six specimens (3 ♀ and 3 ♂) in bred condition (three of them on the last of these nights) of a Micro identified by Dr. de Worms as *Margonaria unionalis*. Its pearly white, translucent wings with a golden brown costal streak make it a singularly attractive insect. Barrett, in his *Lepidoptera of the British Isles*, writes of the moth, " It is so rare with us that very little is known of its habits." He records 16 British specimens in all, of which all but two were taken on the south coast. He states that it " is not apparently known elsewhere in Central Europe." It is an inhabitant of warm and even tropical climates, and is unlikely ever to obtain more than a transitory footing in this country. One other specimen was taken last year. It is recorded in the January number of *The Entomologist* by Mr. Dennis Smith, who took it at light at Leigh-on-Sea, Essex, on the night of August 28. Barrett states that the larva feeds in the autumn on olive. Now olive must be a rare tree in England, and the only one that I happen to know of grows in a garden about a quarter of a mile from my house. There is little doubt that insects cruise around in search of new pastures, which they are probably able to locate by a highly sensitive sense of smell. It may well be that it was the presence of this olive tree that brought the immigrant parents of my specimens to Swanage.

Another rare Micro came to my sheet when, on August 4, I was collecting with Mr. Chipperfield in a wood near Dorchester, and was identified by Mr. Tams of the British Museum as *Diasemia litterata* Scopoli. Barrett mentions a few localities in southern England where it had been taken, but he adds, "I cannnot say that it can now be found with certainty in any one of these localities." It is a beautiful insect, with black and white reticulation ornamenting both fore and hind wings, and of about the size of a medium "pug," which it resembles in its manner of sitting with wings spread out flat upon the sheet.

On August 7, when at Studland with the same collector, a ♀ *Nonagria dissoluta* Treitschke came to his sheet. He kindly handed the specimen to me, as it is new to the Dorset list.

The last, and least in size, but one of the rarest of my 1947 captures, which I have to record, is a specimen of *Eublemma parva*, which I found sitting in a recess of the support of the light in my light-trap, where it was hard to get at, at 9.30 p.m. on September 17. I dashed down and fetched a setting needle, and by this means was able to flick it off into the killing bottle. Until last year only two British specimens of the insect appear to have been known. Besides my own, three other examples were taken in this country in the year, two at Looe, Cornwall, by Mr. S. N. A. Jacobs, and one in Sussex, by Dr. J. A. Walker.

VANESSA ATALANTA PAIRING AND LAYING IN SPRING.—Mr. N. Gloster caught two *V. atalanta* in different parts of Blean Wood, and thinking they were a pair decided to keep them alive. He took them home, and on June 14 they mated in a breeding-cage. He found them paired about 4.30 p.m., and they were still *in coitu* when he looked at them last thing at night. The following day the female began to lay on potted nettle. This indicates that migrant females are not always fertile on arrival in this country, as I believe was previously generally assumed. On the other hand, if these were hibernated insects, which seems quite possible, it is even more interesting. It would prove that, given a mild winter, they can survive here and have sufficient vitality to pair and carry on the race, which has always been doubted by every writer on this subject.—L. HUGH NEWMAN, F.R.E.S.; "The Butterfly Farm," Bexley, Kent.

SOME SPECIES OF CRAMBIDAE (LEPIDOPTERA, HETERONEURA, PYRALINA) OBSERVED IN MALTA.

By C. De Lucca, B.Sc., M.D.

The species enumerated below have all been captured by me in Malta. They are considered to be additions to the Maltese lepidopterous fauna, as they do not figure in any of the lists so far published. Many other species which I am certain belong to this family of moths are in my collection, but still await identification.

1. *Sylepta ruralis* Scop.: six specimens were caught at Guardamangia Hill in October, 1944. Other specimens were observed at B'kara in the same month. The moths came to the light in my room at about two hours after dark.

2. *Ulotricha egregialis* H-Sch.: two specimens were caught, one at Imriehel, limits of B'kara, in the summer of 1941, the other in a field near Wied Incita in the summer of 1945. This species must be somewhat rare, as I have met with it only twice in my frequent rambles.

3. *Agonopteryx thapsiella* Zell.: two specimens came to the light in my room in September, 1943. I have not met with another specimen since.

4. *Uresiphita polygonalis* Schiff.: I recovered one specimen from B'kara at night in August, 1943. In the summer of 1944 I observed a good number of specimens at Guardamangia Hill. The species was again very common in 1946, when I caught some specimens at Sta. Vennera. All the moths came to the light. The species can be considered as common.

5. *Pyrausta sanguinalis* L.: only one specimen has been captured at a field at Imriehel on an afternoon in August, 1938. The moth was resting on a dried-up thistle plant (*Galactites tomentosa* Moench.), and flew from one thistle to another when disturbed.

6. *Ercta ornatalis* Dup.: three specimens were recovered from a partly demolished cottage at Wied Incita in September, 1945. I captured another specimen on August 25, 1947, and I have found two specimens in a small collection made by Mr. Fava some twenty years ago. This species is very uncommon, although one may infer that it has been present many years.

I am very much indebted to Mr. W. H. T. Tams, F.Z.S., F.R.E.S., for his kindness in identifying the moths.

4 Valley Road,
B'kara, Malta.

THE HISTORY, STATUS AND PROSPECTS IN ENGLAND OF *COENONYMPHA TULLIA* MÜLLER.

By J. E. H. Blackie, M.A.

A hundred years ago the Large Heath or Marsh Ringlet had a wide distribution in the northern counties of England, but since it requires, in that country at any rate, a very specialized kind of habitat and is unable to adapt itself even to comparatively minor changes, the particular localities in which it was found were restricted and most of them were well-known. Since that time drainage, cultivation, peat-cutting, over-collecting and other causes have wiped out the species in many places where it was once common, a fact which is inadequately indicated in most of the books on butterflies, even the most recent, in which former localities are repeated without having been verified. It seemed that it would be both possible and useful to provide a more or less complete account of *tullia*'s former and present distribution and to show how a comparatively common butterfly has become a comparatively rare one, and to emphasize its need for protection.

This has proved a more difficult task than I had expected. A search through back numbers of the *Entomologist*, local lists and books and information from many valued correspondents has revealed many gaps, but the account which follows is perhaps complete enough to be worth publishing and cautious enough, where caution is still of any use, not to endanger the species any further. Publication will, I hope, lead to some of the gaps being filled, and possibly to a realization of the precarious position of *tullia* at the present time, in the southern part of its range.

I have confined my enquiries to England because it is here that the greatest reduction has taken place. In Scotland I understand that the species is still widespread. A brief account of its Welsh distribution by Mr. F. C. Best may be found in the *Entomologist* (**70** : 211), and recent articles make it clear that its status in Ireland is being carefully investigated. It is noteworthy that it has never been found in the Isle of Man, where there are a number of suitable localities. At the risk of incurring the wrath of many entomologists I venture to suggest that this is one of the rare cases in which the advisability of artificial introduction might be considered. A Manx colony, derived either from a single English race or from a mixture of races, would be interesting to watch. It might be a means of preserving a race doomed to extinction in its natural habitat, and the fact of introduction would be well known and could not mislead future students of distribution any more than that of *Lycaena dispar batavus* at Wood Walton.

The following account is arranged under counties in a clockwise sequence, beginning with Staffordshire, the most southerly locality in England, and ending with Lincolnshire from which there is a doubtful old record. The authority for each statement is given in brief and full acknowledgment is made at the end of the article to the individuals consulted.

1. *Staffordshire.*

Chartley Park, 6½ miles N.E. of Stafford, is mentioned in several books. The latest definite record is for 1929, when Canon T. G. Edwards saw one. The dry part of the moss has been ploughed up, but there is a wet portion still remaining where it may possibly survive. Little seems to be known of this Staffordshire race (H.W.D.).

Chorlton Moss, near Whitmore station. This locality is mentioned in the *Victoria County History*, and, so far as I can discover, nowhere else. Probably long since extinct (H.W.D.).

2. *Derbyshire.*

In the *Complete Book of British Butterflies* (p. 82) Frohawk mentions Derbyshire as one of the counties in which *tullia* is found. All the northern counties are given without comment or qualification. I know of no authentic Derbyshire locality, but Chartley (*vide supra*) is near the border, and this may account for what I think must be a mistake.

3. *Shropshire.*

Whixall Moss, S.W. of Whitchurch. The moss is being dug for peat, but the butterfly is believed to survive in one small untouched corner (A.W.B.). It was recorded as "still common" in 1940 (Ellis revision).

4. *Cheshire.*

Almost certainly extinct in the three main areas in which it used to be found.

A. Wilmslow area. It was once found on Wilmslow and Lindow mosses. Day and Ellis both mention it as rare and it had probably disappeared before the end of the 19th century. Lindow still looks suitable.

B. S.W. Manchester area. Hale Moss, given in old books, has long since disappeared. Carrington Moss, W. of Ashton-on-Mersey, was purchased in 1886 by the Manchester Corporation and was cultivated. At that time it was a grouse moor (Coward). The last grouse was shot in 1895, by which time *tullia*, once abundant, had presumably gone.

c. Delamere Forest area. The butterfly was once common on the following mosses in or near the forest: Whitegate Moss (Newchurch Common), Abbotts Moss (on the Warrington-Tarporley road), Hatchmere and Oakmere (Day). This state of affairs continued until about 1900, but by 1913 Mr. Mansbridge recorded that it had become scarce (Ellis revision). On July 11, 1914, Mr. J. Arkle saw only five specimens (*Entom.*, 47 : 226). By 1915 all the colonies had disappeared except the one at Whitegate Moss. In that year Mr. A. W. Boyd and Mr. L. Nathan saw it there, and these are the last records I have been able to obtain.

The cause of this lamentable occurrence was almost certainly over-collecting. The Delamere form was the most striking of all the *philoxenus* group and was most sought after. Mr. A. E. Tonge tells me that the species was exterminated by the submergence of its breeding ground. This was perhaps the *coup de grace* when there were no other neighbouring colonies left from which Whitegate could be recolonized.

5. *Lancashire.*

The impression created by many of the earlier books is that *tullia* was widespread in Lancashire. This may once have been so, but such evidence as is available points to its having been restricted to a few well-defined localities, during the period when it was under observation.

A. Manchester area. It was in this area, which includes the two adjacent areas listed under Cheshire, that *tullia* was first discovered in or before 1795, and was named the Manchester Argus. The following mosses were its haunts:

(*a*) Somewhere between Stockport and Ashton-under-Lyne. I have not been able to identify this locality where Humphreys and Westwood (1849) say that it was taken plentifully. It was presumably near Strines reservoir and must have been lost ground for many a year.

(*b*) Trafford Moss, Trafford Park. The name "Moss Bridge" over the Bridgwater Canal is the sole trace of this vanished moss, the site of which is covered with factories. Until the construction of the Ship Canal in 1894, Trafford Park was a private estate. I cannot discover how long *tullia* survived there.

(*c*) White Moss. This lay between New Moston and Blackley, on the northern outskirts of the city. It is still an open space and may be seen from the Manchester-Middleton road. It was drained about 1850.

(*d*) Chat Moss. This extensive moss lying to the west of Eccles and crossed by the main L.M.S. line from Manchester to Liverpool, is given as a locality for *tullia* in most of the books including the new edition of South (1941). But as long ago as 1900 Mr. A. E. Wright could find no trace of it. It was still abundant in 1868 (*V.C.H.*) and perhaps survived for another dozen years. Drainage, cultivation and tipping had destroyed the habitat in all probability before 1890.

B. Warrington area. Risley and Rixton (Woolston) mosses are given as localities by all the older writers. In the *Handbook* of the Manchester meeting of the British Association in 1887 Risley is mentioned. The author, Mr. J. Cosmo Melvill, was an accurate entomologist, but, in view of the tendency to repeat unchecked information, I doubt whether this can be taken as positive evidence of survival to that date.

C. Ormskirk area. *Tullia* was once common on Simonswood moss five miles S.S.E. of Ormskirk. It had already become scarce by 1904 (Ellis revision), and in 1911 Mr. Mansbridge could only find two specimens. I had supposed it to be extinct in the absence of any later information, but Baron C. G. A. de Worms tells me that it is still there.

D. Heysham area. *Tullia* was found on Heysham Moss as late as 1892 (Ellis revision), but I have no later information. Roudsey Moss, which neither I nor the Lancashire County Archivist can identify, was said to be a good locality in 1897 (Ellis revision). Mr. J. A. Whelan says that the butterfly is still found in an unnamed locality in West Lancashire, thirty miles from the Westmoreland border which is presumably in this area (N.W.N. 1946–7, p. 252).

E. North Lancashire area. This part of Lancashire, north of the Kent estuary, is detached from the rest of the county while Westmoreland on its eastern border, extends south of the estuary and includes Arnside. The groupings "Grange and Silverdale," "Witherslack and Arnside" usual in books, are comitally correct but geographically misleading since Grange and Witherslack are on the north and Arnside and Silverdale close together on the south side of the Kent. The only mosses in North Lancashire from which *tullia* has been reported are those between Holker and Haverthwaite, west of Cartmel, where it was common in 1913 (Ellis revision) and where Dr. Birkett says it is found still "very locally and sparingly."

[*N.B.*—Lindon Moss, Lancashire, given in Humphreys and Westwood, is unidentifiable. Probably Lindow Moss, Cheshire (*q.v.*) is intended.]

6. *Westmoreland.*

Morris recorded *tullia* from "near Derwentwater," but the metropolis is the various mosses in the Witherslack area where it is still common. Provided these are left undisturbed and not over-collected the survival of the fine *philoxenus* form seems reasonably sure, but the warden of Meathop Moss had been withdrawn when I was there in July, 1947, and extensive felling was in progress. *Plebejus aegon masseyi* was not to be found and the Cheshire history of *tullia* might all too easily be repeated in Westmoreland.

7. *Cumberland.*

Newman (1869) said, on the excellent authority of Hodgkinson, that *tullia* was to be found on "all the mosses in Cumberland." Barrett (1893) more or less confirms this. Frohawk records it from near Kendal (*Entom.*, **46** : 145 *et seq.*). The Rev. H. D. Ford records it in 1927 in large numbers in the localities it frequents (*Entom.*, **60** : 18) and in 1930 as " common in its special habitats " (*Entom.*, **63** : 23). Baron de Worms tells me that he is " doubtful if it occurs on any mosses in Cumberland except those of the Solway." That is the sum total of my information for the county. It suggests that *tullia* is more restricted than formerly, but still common where it occurs. A more detailed account would be interesting.

8. *Northumberland.*

Humphreys and Westwood (1841) give " plentiful on damp heaths " ; Newman (1869) gives only one locality, Prestwich Carr, which I take to be Prestwick, 6½ miles N.W. of Newcastle. Barrett (1893) says " apparently exterminated." In view of this depressing sequence it is pleasant to learn from Prof. J. W. Heslop Harrison that it is still widespread in the county. In addition to Whitfield Fell (*Entom.*, **51** : 150) he mentions twelve localities in which he has reason to believe it still exists. As none of these has, so far as I know, been published, I think it better not to give them.

9. *Durham.*

The status of *tullia* in Durham is not easy to determine. Newman (1869) quotes the following localities from Wailes' *Catalogue* where they were given on the authority of William Backhouse, Needless Hall Moor, Cambo Moors (near Otterburn), Muckle Moor (near Hayden Bridge), Craigclough and Mull. In *Entom.*, **51** : 150, Prof. Heslop Harrison writes that he has never seen an authentic Durham specimen exceptfrom one spot, generally unknown, which he had no intention of revealing. In a recent letter he adds two old localities Hoppyland and Cauldron Snout, and says " there is no reason to think that the insect has vanished."

10. *Yorkshire.*

Reliable and up-to-date information for this county has been difficult to obtain. Mr. E. Dearing, the official recorder of Lepidoptera, who has kindly sent me one or two records, has little to add to what is available in the older books.

A. North Riding. Whitby Moors is mentioned by Frohawk (*Entom.*, **46** : 145) as a locality from which he obtained a specimen in 1909. There is a record from here for 1946, but no indication of numbers (E.D.). Glaisdale and Pickering are given as localities in *V.C.H.*, **1**, and the butterfly is there said to be abundant. Prof. Heslop Harrison says it is still to be found near Goathland, the form there being a mixed race including *scotica*, but not *philoxenus*.

Mr. Dearing has a 1947 record from a locality in the North Riding not previously mentioned which it is perhaps as well not to disclose.

Barrett writes "not scarce in Wensleydale," and in *V.C.H.* "near Hawes" is given. I have no later information. *V.C.H.* also mentions (**1** : 248) a locality in Langstrothdale where Mr. T. Brain had found a form which he described as being intermediate in appearance between *C. Davus* and *C. pamphilus*. In Porritt's Supplement this is said to have been taken by Mr. T. B. Woodd.

B. West Riding. Porritt records that a specimen was taken about 1870 on Adel Moor, near Leeds, by Mr. W. E Clarke. He presumes that it had been "turned down" there.

C. East Riding. Porritt gives Cottingham on the authority of T. C. Dale. This is presumably the locality "near Beverley" mentioned by Humphreys and Westwood. There is no mention of it in *V.C.H.* and no doubt the butterfly has long been extinct there.

Thorne Waste near Goole was once a famous locality. Porritt (1904) said that it was abundant there nearly every year. By 1907 fears were being expressed in *V.C.H.* for its survival. The locality is now a favourite picnic-ground but Mr. Dearing tells me that it is still quite common.

Hatfield Moors, between Doncaster and Goole, is another famous locality and here it probably survives and has fair prospects as the moors are (or were) strictly preserved and the butterfly is difficult to collect. Mr. T. R. Jenkyn found it there in 1934, and some specimens in Mr. L. Nathan's collection marked "Nr. Doncaster 1937" and taken by Mr. A. E. Tonge, were probably from Hatfield.

Shorn Moor, mentioned in Humphreys and Westwood, I cannot identify, and I suspect it to be a misprint for Thorne (*q.v.*).

11. *Lincolnshire.*

Morris gives " near Glandford, Brigg " as a locality for *tullia.* He was not at all critical of information received and also mentions, without comment, a Norfolk locality ! I cannot find any Glandford in Lincolnshire (there is one in Norfolk which suggests a muddle), but there are places north of Brigg which might have been suitable and the East Riding localities are not far away. In the absence of any further information the record should, perhaps, be rejected.

The following gentlemen have most kindly helped me in the compilation of this article, and to them I desire to express my warmest thanks. Professor J. W. Heslop Harrison, Messrs. H. W. Daltry, A. W. Boyd, W. Mansbridge, L. Nathan, A. E. Tonge, Baron C. G. A. de Worms, Messrs. A. E. Wright, E. Dearing, W. D. Hincks, T. R. Jenkyn and Dr. N. L. Birkett. Printed sources of information briefly acknowledged in the text are :

Entom.—*The Entomologist.*
N.W.N.—*The North-Western Naturalist.*
FROHAWK.—*The Complete Book of British Butterflies.*
ELLIS, Rev.—*The Lepidopterous Fauna of Lancashire and Cheshire.* J. W. Ellis (revised by W. Mansbridge, 1940).
DAY.—*List of the Lepidoptera of Cheshire, etc.* G. O. Day (1903).
HUMPHREYS and WESTWOOD.—*British Butterflies* (1849).
SOUTH.—*British Butterflies* (revised 1941).
MORRIS.—*Natural History of British Butterflies.* Rev. F. O. Morris.
NEWMAN.—*Natural History of British Butterflies.* Edward Newman (1871).
BARRETT.—*British Lepidoptera,* Vol I. C. G. Barrett (1893).
PORRITT.—*Yorkshire Lepidoptera.* G. F. Porritt (1904).
V.C.H.—*Victoria County Histories of Lancashire, Yorkshire and Staffordshire.*
COWARD.—*Fauna of Cheshire.* T. A. Coward (1910).

The Bell House,
Alconbury,
Hunts ;
December, 1947.

NYMPHALIS ANTIOPA L. AT SOLIHULL, WARWICKSHIRE.—On August 5 last my neighbour, Mr. L. Mathews, gave me a newly caught specimen of the " Camberwell Beauty " (*N. antiopa*). He had just found it at rest on some timber sheltered by the hedge dividing his garden from my own. The insect was in fresh condition, apart from damage received in capture.—G. C. PRICE ; " Alpha," 67, Cornyx Lane, Solihull, Warwicks.

NYMPHALIS ANTIOPA AT LLANDUDNO.—A male specimen of this species with cream-bordered wings was handed to me on August 5, having been caught on that date in a tea-garden on the S.W. slope of the Great Orme's Head.—G. ELLIS, F.R.E.S., F.R.A.S. ; " Blodfryn," Bryn Pydew, Llandudno Junction, Caerns.

SOME NEW SOUTH AFRICAN NEUROPTERA.

By D. E. Kimmins.

The following descriptions were drawn up about ten years ago, during the working-out of some of the Neuroptera collected by Mr. R. E. Turner in South Africa. At the time it was intended that they should be included in a complete list of the species of this group collected by Mr. Turner. In the interval the specimens have been incorporated in the collections, and this short paper is presented to validate the manuscript names. All the material is in the British Museum (Natural History).

Myrmeleonidae.

Exaetoleon gen. nov. (*Formicaleonini*).

♀. Tibiae with spurs absent or indistinguishable from the surrounding bristles. Basal segment of tarsus a little shorter than segments two to four, and about equal to segment five. Wings pointed but not falcate. Posterior wings shorter than anterior. A number of cells between Cu_1 and Cu_2 in anterior wing divided into two. An additional cross-vein between 2A and the anterior branch of 3A. Vertex of the head somewhat inflated.

Genotype: *Myrmeleon obtabilis* Peringuey, 1910.

This genus differs from *Gymnoleon* Banks in the shorter posterior wings, and from *Delfimeus* Navas in the broader wings, the division of the cubital cellules, and the additional cross-vein between 2A and 3A in the anterior wing, and from both in the greater distance of Cu_1 from the margin of the posterior wing.

Exaetoleon obtabilis (Peringuey, 1910).

Myrmeleon obtabilis Peringuey, 1910, *Ann. S. Afr. Mus.*, 5 : 444.

1 ♀, S. Africa, Cape Prov., Ceres, i.1925 (*R. E. Turner*).

Formicaleon pondoensis sp. n.

Head fulvous, an inverted V-shaped piceous band below the antennae, and above them a dull fuscous band. Vertex with a curved band of piceous spots. Antennae reddish yellow, annulated, club darker, second segment with a piceous spot externally. Pronotum fulvous, with a longitudinal fuscous band on each side of a narrow median line, lateral margins from the base to the transverse suture piceous and a short piceous line between this margin and the median fuscous band. Meso- and metanota fulvous, with fuscous markings. Pleurae with a dull piceous band. Legs yellowish, clothed with black and white bristles, femora tipped with piceous, which colour extends over the apical dorsal half of the anterior pair. Tibiae tipped with piceous, anterior and median also with a band before the middle. Spurs reddish brown, anterior and median as long as four, posterior as long as three tarsal segments. Tarsi with the tips of the first four and the apical fourth of the fifth segment black. Abdomen fulvous, with obscure fuscous markings, beneath fuscous; in the ♂ about 1¼ times as long, in the ♀ about ¾ as long as posterior wing. Anal plates of male short, lower angle produced tailward in a finger, fulvous, clothed with fine white and coarser black bristles. Anal plates of female with black bristles and a tuft of whitish hair.

Wings hyaline, venation pale, marked with fuscous. In anterior wing, an oblique fuscous streak arising from the anastomosis and another towards the apex of the wing over the gradate series. Several cross-veins from the radius to the sector fringed with brown at their junction with the radius, as are also several cross-veins arising from Cu_{1a}, and the marginal furcations of many veins. In the posterior wings the brown markings are largely restricted to the marginal furcations in the apical part of the wings.

Length of body . . .	♂ 48 mm.;	♀ 33 mm.
,, anterior wings .	♂ 31 ,, ;	♀ 35 ,,
,, posterior wings .	♂ 31 ,, ;	♀ 36 ,,

S. Africa, Pondoland, Port St. John, i–iii.1924 (*R. E. Turner*) 2 ♂, 3 ♀. Type ♂, and paratypes in British Museum (Natural History).

This species resembles a rather pale *F. ilione* Banks, but differs in many points, such as: Fuscous band above antennae. Pronotum with a pair of fuscous stripes separated by a narrow pale line. Basal tarsal segment not especially short (about equal to 2 and 3). Venation not heavily marked, spot at base of stigma very small.

Tricholeon nigripes sp. n.

Head ashy yellow, a shining piceous band between and surrounding the antennal bases, and a narrow dull band of the same colour on the vertex, composed of three elongate spots. Occiput with an obscure, piceous, transverse streak. Antennae yellowish, with reddish brown annulations, basal segments piceous. Pronotum ashy yellow, with a narrow black median line and numerous small black spots anteriorly. Meso- and metanota yellowish, with small black markings. A broad black stripe along the pleurae. Legs yellowish, anterior femur with a black apical ring and a black streak on its dorsal surface extending nearly to the base, median and posterior femora with an apical ring and numerous black spots. Tibiae with a black apical ring and numerous tiny spots. Anterior, and to a lesser degree the median, tarsi piceous, posterior fuscous. The tarsal claws are straight, and, as in *T. hirtellus*, appear to be capable of folding back upon the terminal segment like the blade of a pen-knife. Abdomen ashy yellow, with pale hairs, segments with piceous apices and a narrow median basal streak. Segment 2 almost entirely piceous. Anal plates of ♂ short, deep, apical margin slightly convex; yellowish, apex blackish clothed with black bristles.

Wings hyaline, shaped rather as *T. hirtellus*, but broader and more pointed. Anterior Banksian line distinct. Venation pale with brown streaks, densely hairy. In anterior wings there are three brown spots along the radius, one about midway, one just before the stigma and one near the apex. An oblique brown streak extending from the anastomosis to Cu_{1a}, and two parallel streaks, the inner the stronger, along the gradate series. Many other cross-veins fringed with brown. Stigma opaque, whitish.

Anterior wing . . .	♂ 30 mm.;	♀ 27–33 mm.
Posterior wing . . .	♂ 29 ,, ;	♀ 27–33 ,,

S. Africa, Pondoland, Port St. John, ix–xi.1923, 1 ♂, 1 ♀; Cape Prov., Ceres, iv.1923, 1 ♀ (*R. E. Turner*).

Type ♂, and paratypes in the British Museum (Natural History).

This species may be separated from *T. hirtellus* Esb.-P., as follows: The piceous anterior tarsi and dorsal surface of anterior femora. Broader, more pointed wings, particularly in the ♂. Definite wing markings and distinct Banksian line. More numerous branches to Rs. Fork of 1A in posterior wing more pointed.

CHRYSOPIDAE.

Nothocrysa turneri sp. n.

♀. Head yellowish, frons and vertex shining. Antennae about four-fifths as long as anterior wing, piceous, except two basal segments, which are yellowish. Prothorax about one-and-a-half times broader than long, anterior angles rounded, a shallow transverse furrow near midway; colour yellowish, lateral margins reddish. Meso- and metanota yellowish, with small brown spots. Abdomen yellowish, with obscure brownish markings. Legs yellowish, femora with subapical pale brown bands. Tarsal claws with small basal teeth. Wings elongate, with narrow rounded apices. Longitudinal veins pale yellowish, except Rs and its branches, which are brown, entirely so in anterior wing and only in the apical half of posterior wing. Anterior wing with all costal cross-veins (except those near the stigma) brown. Most of the veins in the distal parts of both wings brown, as are the following veins in anterior wing: Cross-vein between M_{3+4} and Cu_1; between Cu_1 and Cu_2; base of Cu_2; branches of Cu_1; cross-vein between 1A and 2A. Stigma long, pale yellowish.

In anterior wing, costal cross-veins 18; cross-veins R–Rs, 11–12; Rs–Psm, 5; Psm–Pscu, 8; branches from Pscu to wing margin, 11–12; apical 3 or 4 forked. Inner gradate series 5, outer 6–7.

In posterior wing, costal cross-veins, 18-19; cross-veins R–Rs, 10–11; Rs–Psm, 4–5; Psm–Pscu, 8; branches from Pscu to wing margin, 11–12, apical 3 or 4 forked. Inner gradate series 5, outer 6.

Length of anterior wing . . .	15·5 mm.
,, posterior wing . . .	13 ,,

Type ♀, S.W. Africa, Aus, xii.1929 (*R. E. Turner*).

This species differs from *N. variegata* (Burm.) in its smaller size, more rounded apices of the wings, fewer branches of Rs, and consequently fewer gradate veins.

British Museum (N.H.),
London, S.W.7.

NYMPHALIS ANTIOPA AT STRATFORD-ON-AVON.—A perfect specimen of a "Camberwell Beauty" was caught in a garden in Stratford on July 30. It was found about 5.30 p.m. feeding on a ripe plum on a tree. There is a local collection made between 1880 and 1900, in which there is a single specimen of a "Camberwell Beauty," so that also may have been found in or around Stratford. The present specimen caught this year is now in my collection.—(Rev.) ANDREW ALLAN; St. James House, 61, Maidenhead Rd., Stratford-on-Avon.

NYMPHALIS ANTIOPA IN NORTH HERTS.—A "Camberwell Beauty" was seen in a garden in The Broadway here on August 19, 1948, by a schoolboy, John Webb. It was on a hollyhock, but quickly flew away over a hedge. Three days earlier a lady resident in an adjacent road described a butterfly which she saw three times; the description tallied with *N. antiopa*, a picture of which she recognized. This was probably the same insect.—S. R. BOWDEN; 33, South View, Letchworth.

DANAUS PLEXIPPUS IN CHESHIRE.—A medical colleague, Dr. G. P. Owen, has informed me that he saw and examined a specimen of the Milkweed butterfly at his home in the Wirral, about sixteen miles from Birkenhead, during the first week of August. The time was early evening, and the weather cold and windy. The butterfly was resting just inside an open window, on the frame, and seemed very somnolent, as it made little attempt to struggle while being examined. Its condition, however, was very good. It appeared to have flown in through the open window to obtain some shelter from the weather. Dr. Owen did not know its identity at the time, but was struck by its unusual appearance, and later recognized a coloured photograph of *Danaus plexippus* in a magazine as the butterfly he had seen. To confirm this I showed him the illustration of the species in South's *Butterflies of the British Isles*, and he agreed that this was similar to his specimen. Unfortunately it was later liberated, so that I have been unable to confirm the identification.—C. J. GOODALL, M.B., B.S.; 77, Sandylands Promenade, Morecambe, Lancs, August 29, 1948.

NOTES ON *SPHAERIDIUM* (COLEOPTERA: PALPICORNIA; SPHAERIDIINAE).

By J. Balfour-Browne, M.A., F.Z.S., F.R.E.S.,
British Museum (Natural History).

Sphaeridium ornatum Boh.

Sphaeridium ornatum Boheman, 1851, Ins. Caffr. 1 : 604 (Fl. Gariep = Orange River).

Sphaeridium consobrinum Boheman, 1851, loc. cit., 605 (Fl. Limpopo = Crocodile River).

Sphaeridium sharpi von Harold, 1878, Monatsber. Acad. wiss. Berlin, 210 (Zanzibar). **Syn. nov.**

Sphaeridium sharpi d'Orchymont, 1943, Bull. Mus. Roy. Hist. nat. Belg., **19**, No. 39 : 9.

D'Orchymont (1919, *Ann. Soc. ent. France*, **88** : 114) reported on his examination of a male paratype of this species, but made no reference to the structure of the aedeagus in this note. He further stated, on the authority of Sjostedt, that the type series consisted of three specimens of identical coloration, and all possessing three spines on the ventral face of the posterior tibiae.

Marcuzzi (1943, *Ann. Mus. Civ. Stor. nat. Genova*, **61** : 109, pl. 4, fig. 8) ascribes to this species a form in which the aedeagus is not very acutely pointed, and the median unpaired ventral piece of the median lobe is emarginate-truncate at the apex.

D'Orchymont (1943, *loc. cit.*) stated that in 1936 he again examined the male paratype referred to in his previous note, and he goes on to state that on dissection it was found that the median unpaired ventral piece of the aedeagus was broken off just before the extremity, so that it was impossible to say whether this piece was, as figured by Marcuzzi, emarginate-truncate at the apex as in specimens from East Africa and the Belgian Congo, or if it was triangular and acutely pointed at the apex as in *sharpi* von Harold, from Zanzibar. He further states that the lateral fuscous band of the elytra is very elongate and parallel-sided in the typical *ornatum* and *consobrinum*, whilst in the East African specimens with emarginate unpaired median ventral piece the fuscous spot is always shorter, irregularly punctiform; that since in the related species, *sigillum* d'Orch. from Ruanda, the form of this spot is remarkably constant, he doubted the accuracy of the determination of non-South African specimens as *ornatum* Boh., and assigned to this form with the punctiform elytral spot a sub-specific status under the name *ornatum ortivum* d'Orch., further stating that this subspecies would automatically acquire full specific status if it later was proved to be distinct from the true *ornatum* by the form of the aedeagus.

In answer to my request Dr. R. Malaise, of the Stockholm Museum, was kind enough to send me for examination the three specimens of the type series of *ornatum*—the holotype, a male (4·77 × 3·35 mm.) (with the Museum " Typus " label), and further labelled "Caffraria/J. Wahlb./*ornatum*/type/163); the paratype male seen and dissected by d'Orchymont, and a paratype female (4·96 × 3·29 mm.). The holotype has now been dissected and the aedeagus and abdomen mounted together on a card below the specimen. In this individual the unpaired median ventral piece of the median lobe is complete, triangular and very acutely pointed. This character immediately defines the species as distinct from *ornatum ortivum*. It is further to be noted that the form of the aedeagus agrees exactly with the figure given by d'Orchymont of the aedeagus of the holotype of *S. sharpi* von Harold, and also with that of specimens before me determined on the authority of that figure.

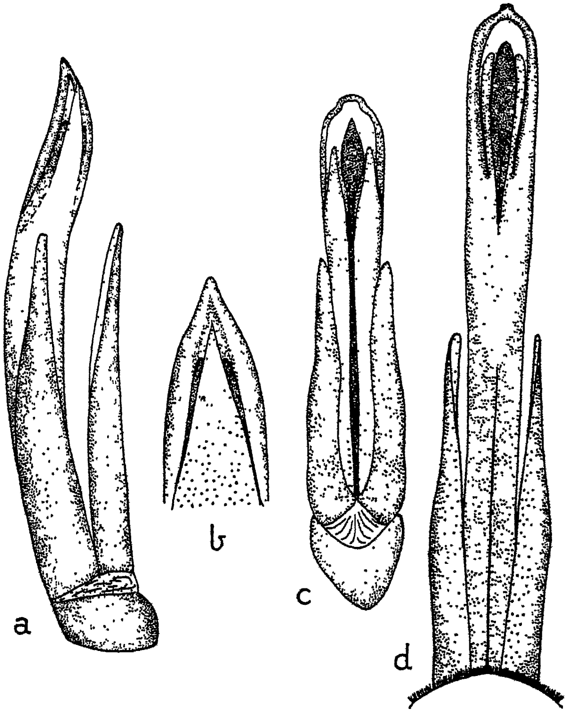

FIG. 1.—(*a*) Aedeagus of holotype *Sphaeridium ornatum* Boh., latero-ventral aspect from the right side. × 40. (*b*) Extreme apex of median lobe, ventral aspect. × 75. (*c*) *Sphaeridium pallidum* sp. nov. Aedeagus, ventral aspect. × 40. (*d*) *Sphaeridium circumcinctum* Rég. Aedeagus, ventral aspect. × 40.

The types of *sharpi* were from Zanzibar. Specimens I have identified as this species are from Kenya: Elmali Range, Sultan Hamud, one of which was seen by d'Orchymont and regarded by him as "very probably" correctly identified as that species. D'Orchymont suggests that the differences between *ornatum* and *sharpi*, excluding the form of the aedeagus known to him, seem only to lie in the slight differences in the form of the fifth anterior tarsal segment and the shape of the inner anterior tarsal claw of the male. On comparison between specimens these differences are seen to be illusory, and the identical form of the aedeagus is a peremptory indication of the conspecificity of the two forms. I am, therefore, satisfied that, on the published interpretation of the types of *S. sharpi* von Harold given by d'Orchymont, this is a simple synonym of *ornatum* Boh.

Sphaeridium ortivum d'Orch.

Sphaeridium ornatum Marcuzzi, 1943, loc. cit., 109, pl. 4, fig. 8 (*nec* Boheman).
Sphaeridium ornatum ortivum d'Orchymont, 1943, loc. cit., 9.
Sphaeridium quadratum J. Balfour-Browne, 1948, in press.

As I have shown above that the aedeagus of the type specimen of *S. ornatum* Boh. with the apex of the median unpaired ventral piece of the median lobe acute, triangular, proves it to be conspecific with *sharpi*, it is at once evident that *ornatum ortivum* d'Orch. must be specifically distinct therefrom, and accordingly the specific name must become *ortivum* d'Orch.

Owing to a misunderstanding of statements by d'Orchymont I have recently re-described this form under the name *quadratum* sp. nov. Since that description was sent to press I have seen co-types of *ortivum*, and am therefore compelled to suppress the name *quadratum* as a synonym of *ortivum*. My mistake lay in origin in d'Orchymont's statement that the aedeagus of *ornatum*, exclusive of the form of the apex of the median unpaired ventral piece of the median lobe, was similar to that of *sharpi*. Accordingly, having material of *sharpi* before me and noting the distinct difference in the form of the aedeagus, it was at once apparent that I was dealing with two distinct full species, as indeed is now seen to be the case between *ornatum* and *ortivum*.

Sphaeridium pallidum sp. nov.

Sphaeridium ornatum J. Balfour-Browne det in coll., *non* Boheman.

The examination of the type of *ornatum* and the recognition of *ortivum* as a distinct species has also enabled me to recognize this error of determination. As I have sent out material under this name it is necessary to make this correction.

This form gave me much difficulty in the original instance;

although responding remarkably closely to the re-descriptions of *ornatum* given by d'Orchymont, except as regards the fifth tarsal segment of the anterior legs of the male, the aedeagus is relatively bluntly rounded, not acute. As soon as the real identity of *ornatum* was established and *ortivum* recognized it became evident that the present species was perfectly distinct and, in fact, much nearer to *S. circumcinctum* Rég., from which, however, it differs in a considerable number of characters.

Head black, the anterior edge of the clypeus narrowly flavous; labrum flavous; antennae and palpi flavous; closely finely punctulate, shining. *Pronotum* black or rufo-piceous, the anterior margin narrowly, the sides broadly flavous; posterior angles bluntly rectangular; punctured as on the head, a little less closely towards the sides. *Scutellum* rufo-piceous to piceous, densely punctulate. *Elytra* flavous, with a large piceous or rufo-piceous macula on the disc towards the base, and a submarginal elongate patch from behind the shoulder to beyond the middle black; the basal macula on the disc prolonged backwards to a little beyond the middle, but not along the suture, the submarginal patch not anteriorly joined to the basal macula; the male in the scutellar region punctured as on the head, towards the sides and apex progressively more strongly but less closely punctured, the interstices both on the piceous and flavous portions entirely shining, without trace of reticulation; in the female on the disc finely but distinctly microreticulate, very obsoletely punctured except at the base on the piceous macula, on the flavous portion less obsoletely, more finely punctulate, towards the sides and apex more obsoletely reticulate, more distinctly and strongly punctulate and subnitid; both sexes with a distinct, sharply impressed sutural stria and a strong lateral margin which is widely interrupted round the apex and does not attain the apex of the sutural stria; apex widely smoothly rounded in the male, in the female with the apex strongly produced, the sutural apex sharply rounded. *Venter* flavous, intermediate and posterior femora beneath with a rounded spot; metasternum in the middle with a germinate spot, towards the sides and on the episterns with an irregular spot, black; ventrites obscurely transversely banded with black; mentum strongly but finely transversely reticulate, somewhat obsoletely and not very closely punctulate; metasternum rather deeply sharply longitudinally sulcate in the middle. *Legs* flavous, anterior tarsi of the male with the fifth segment gradually inflated from base to apex, the transverse apical width only about one-third the length; inner claw of the anterior tarsi of the male stout, strongly hooked, the apex abruptly narrowed and acute; hind tibiae beneath with three setae on each side. *Aedeagus* with the median lobe terminally bluntly rounded, the extreme apex slightly deflected ventrally when seen from the side; unpaired median ventral piece terminally subacute, lanceolate, with a strong rib-like stalk to the base; parameres attaining two-thirds of the length of the median lobe.

Holotype ♂, Kenya: Kanziko, ix.1936 (*MacArthur* coll.), 4·26 × 2·71 mm., in the British Museum.

Paratypes: Kenya, Makindu, vii.1937 (*MacArthur* coll.), 1 ♀, 5·94 × 3·29 mm.: Kanziko, i.1942 (MacArthur and Museum Staff coll.), 12 specimens. In the British Museum, Coryndon Memorial Museum and Naturhistoriska Riksmuseum, Stockholm.

As has already been stated, this species approaches more closely to *circumcinctum* Rég. in the form of the aedeagus (Fig. 1, *d*) than to the other species running to this section of the Key to the African species of the genus given by d'Orchymont. It differs radically from that species in the colour pattern, which is extremely similar to that of *ornatum* ; it also differs in the complete absence of reticulation on the head, pronotum and elytra of the male, in the more rounded apex of the median lobe of the aedeagus, in the shorter median lobe in comparison with the parameres (which only attain half the length of the median lobe in *circumcinctum*), and in the different shape of the apex of the median unpaired ventral piece of the median lobe of the aedeagus. As is usual in the species of this section, the colour pattern is remarkably consistent throughout the series.

NOTES AND OBSERVATIONS.

Colias hyale in Essex.—In a field of clover yesterday near here I was astonished to see five *C. hyale* flying. I took one, a female. A further surprisew as to take a perfectly fresh *C. croceus* ab. *pallida.* There was no sign of the typical *croceus.* As a rule one may see a hundred or more *croceus* before spotting *helice* or *pallida.*—A. F. Common; 316, London Rd., Westcliff-on-Sea, August 30, 1948.

Colias hyale in Suffolk.—On June 15 my wife saw six *C. hyale* (or, of course, possibly *alfacariensis*) on the shingle just south of Aldeburgh, and another on June 16 between Aldeburgh and Thorpeness. We looked out for others on subsequent days, but the weather was sunless and cold for the rest of our stay.—J. E. H. Blackie; The Bell House, Alconbury, Huntingdonshire.

Food-plant of Colias croceus.—I have been rather surprised that in the notes which have appeared on this subject no mention has been made of the bird's-foot trefoil, *Lotus corniculatus.* In France some years ago I sleeved a number of females on sainfoin, white clover, red clover and *Lotus corniculatus*, and I found that all the ova without exception were deposited on the last named. The larvae fed up rapidly, and the first butterflies appeared in less than six weeks. Incidentally, *Colias phicomone* is also partial to the *Lotus.* I have repeatedly seen females ovipositing on it.—J. A. Simes; 75, Queen's Road, Loughton, Essex.

Aberration of Anthocharis cardamines.—During a visit to Dublin I went out collecting on June 12, 1948, with Dr. Brian Beirne and his wife in a marsh at Kilmacanogue, Co. Wicklow. Of the only two Orange tips I saw and took, one turned out to be a most striking form of the female, with the tips of the fore wings a bright ochreous brown instead of the usual black. The antennae are much paler than in a normal specimen, and the whole insect presents a distinctly albinistic appearance. I have not been able to discover another record of this form from Ireland.—C. G. M. DE WORMS.

VANESSA CARDUI IN SWITZERLAND.—I was at Zermatt from July 4 to 11, and at Simplon Kulm the following week. The weather was poor, few days being really fine. *V. cardui* was often seen in both localities—possibly a couple of score in all. Without exception the insects were very worn and faded. Possibly these were some of the butterflies seen crossing the Mediterranean on June 9 as recorded by Mr. Sevastopulo, *antea*, p. 186.—J. A. SIMES; 75, Queen's Road, Loughton, Essex.

ABERRATIONS OF PARARGE MEGERA AND AEGERIA.—On May 3 I captured a *Pararge megera* with the left hind wing bleached white, and on May 16 I was lucky enough to capture a *Pararge aegeria* of a dark brown colour, with only faint yellow spotting on the fore wings. I have also noticed several *Maniola jurtina* bleached in places this season.—GERALD TREMEWAN; Wheal Rose, Scorrier, Redruth, Cornwall, September 8, 1948.

PARARGE AEGERIA AND LYSANDRA CORIDON IN MIDDLESEX.—T. G. Howarth's note about *P. aegeria* in Kent prompts me to record that I saw one specimen this year in an old, deserted garden at Hayes, Middlesex. I have never before observed this butterfly in Middlesex except at Ruislip Woods, where it appears to be increasing. The spot where I saw it was ideal for *aegeria*, being a shady lane among the trees; but the area is less than an acre, and is completely shut in by estates of council houses and other suburban features. I should also like to record a further unusual encounter. On July 26 of this year I was surprised to see a male *L. coridon* flying wildly about over a stretch of rough ground by a wood near Harefield, Middlesex. It finally alighted on a bramble bush, where I netted it. This part of Middlesex consists wholly of clay. There are, however, several chalk escarpments and quarries along the Grand Union Canal in the Colne Valley about two miles away, but I have not observed any sign of the food-plant.—ARTHUR A. MOPPETT; 39, Fairdale Gardens, Hayes, Middlesex, September 13, 1948.

LYCAENA PHLAEAS IN 1948.—As I mentioned in *The Entomologist* for May, 1947, and April, 1948, *Lycaena phlaeas* is very liable to seasonal fluctuation in numbers. It was extremely numerous in this area (S. Yorks and N. Lincs) during September and early October, 1947, and because of that it was hoped that 1948 would also prove a good year for the butterfly. Unfortunately, in spite of promising signs in the spring of that year anticipation ended in disappointment. The first brood of this insect is never common here, and it was gratifying to see more than the average number of butterflies in April and May, 1948. The first male was noted on

April 23, and members of both sexes continued to emerge until early June. On this account it seemed reasonable to hope for a strong second brood in late July and August, but no allowance was made for the dull and cold conditions of June and most of July. That disappointing period was undoubtedly to blame for the paucity of the species later. Only a few of the butterflies were seen in late July and August, and these showed no sign of variation. It is, of course, impossible to conjecture from this that similar conditions have existed everywhere, but I shall be surprised to hear that *L. phlaeas* was very common anywhere in Britain in 1948.—George E. Hyde, F.R.E.S.; 20, Woodhouse Road, Doncaster.

Paucity of Butterflies in 1948.—Many observers, apart from collectors, have commented on the paucity of butterflies in 1948, and from personal observation and the remarks of friends living in various parts of the country, I regard this year as the worst of the present century for these insects. Because of the unusually hot summer of 1947, and the consequent activity of butterflies, many entomologists predicted a good season this year. This hope persisted through the sunny days of April and May, and only started to decline after Whitsuntide. In most areas June and a greater part of July were cold and sunless, and butterflies, of even the commonest species, were remarkably reduced in numbers. There is no need to include details of all the disappointing journeys this involved, but it may be added that even when conditions did temporarily improve, the welcome sunshine produced little change. In one regular haunt of *Argynnis aglaia*, *Eumenis semele* and *Plebeius argus* only a single male specimen of the last was seen in mid-July. All three species were common in 1947, but neither of the first two was noticed on this occasion, although long spells of sunshine brought promising conditions. It was assumed that these butterflies, along with others, would appear later, but unfortunately this failed to happen. Not a single *A. aglaia* was recorded, and the few *E. semele* were but a fraction of the normal number. In W. Sussex during late July and early August (including the short hot spell) all the butterflies were far below normal in numbers, and similar conditions were noticed in other areas. An exception was the prolific appearance of *Pararge megera* in Huntingdonshire during Bank Holiday week. The weather was very unsettled at the time, and included many heavy showers and very little sunshine. The butterflies were taking short flights and sitting with their wings open whilst rain fell, and it was pleasing to see them in so barren a season. Various opinions about the cause of this scarcity of butterflies will doubtless be heard, and it seems reasonable to assume that the failure to mature on the part of many larvae between early June and the end of July was one of the main influences at work. I have not seen a single *Vanessa cardui*, very few *V. atalanta*, and only one or two *Colias croceus* (in W. Sussex) this year. The views of other collectors on this intriguing subject should be interesting.—George E. Hyde, F.R.E.S.; 20, Woodhouse Road, Doncaster.

Early Appearance of Heodes phlaeas and Syrichtus malvae, etc.—At Ventnor on April 18 I saw a Small Copper and netted a fresh Grizzled Skipper. By night in this area Commander Harper and I took *Horisme vitalbata*, *Ligdia adustata* and *Oristhograptis luteolata*, all out quite a fortnight ahead of their normal time of appearance. *Lampropteryx suffumata* was well on the wing.—C. G. M. de Worms.

Early Lepidoptera in Somerset in 1948.—I saw a *Vanessa atalanta* flying beside the track of the Somerset and Dorset Railway between Glastonbury and Polsham at about 10.45 a.m. on February 9: the day was sunny, but rather windy. On February 12 I saw two *Aglais urticae* in the garden of "Belfield"; it was a beautiful day. After this there was a short spell of cold weather, but by February 28 hibernated butterflies were in full flight: on March 1 and 2 I saw exceptional numbers of them (Brimstone, Comma, Small Tortoiseshell, and Peacock). March 8 was the best day before my departure from home (on 10th), and I counted a total in my garden of about 24 specimens of these species. On March 4 I saw a *Phigalia pedaria* in my house, and another on March 9. My wife writes to say that she found *Leptidea sinapis* flying in one of its Somerset stations on April 18; and that, at the same time and place, she saw a *Colias croceus* and a *Nymphalis polychloros*; the latter was seen again by Mr. J. E. Herring two or three days later. Edward Newman considered that the Clouded Yellow could hibernate in England in the winged state. If ever there was an occasion when it might have done so it was this: of the teeming myriads of the last long wonderful autumn, surely a few specimens must have survived the almost nominal winter until the early brilliant spring of this year. —I. R. P. Heslop; The Residency, Oyo, Nigeria, September 5, 1948.

Pamphila nostrodamus Fabr. (Lep. Hesperiidae) in Malta.—On August 17, 1948, at 8.40 a.m., while I was collecting at San Anton Gardens, Attard, I took a male *P. nostrodamus*. It was resting on a pink *Zinnia*; an unusual number of *Vanessa cardui* and *Macroglossum stellatarum* were sucking the nectar from the same flowers. On the next morning I visited again the same bed of flowers, and to my surprise I took a female which was resting on another *Zinnia* of the same colour, at 9.55 a.m. On the 19th I took three, 2 males and 1 female at 7.45, 8.15 and 8.30 a.m., two from the same locality and one from another bed of *Zinnia*, but far away from the other one. On the 20th I took another female from the first flower bed. From the 21st to the 23rd I saw no more. On the 24th I took three females at 8.25, 9.40, 10.10 a.m., this time from a private garden at St. Vennera, two from one bed of *Zinnia* and one from another. On the 25th I took another male from San Anton Gardens at 7.50 a.m., and on the 26th another male from St. Vennera. Such a find has never been recorded before—at least it is not mentioned in local publications—and consequently it will add to the List of Maltese Rhopalocera the Family Hesperiidae, which is now represented by this new addition.

Kirby says that this butterfly is found in the South of Europe, North Africa and Western Asia, and is a butterfly of dry places. Maybe that it has migrated this year to Malta, as it has been an exceptionally dry year. My thanks are due to Surgeon-Lieut.-Cmdr. H. M. Darlow, F.R.E.S., R.N., for identifying it for me.—ANTHONY VALLETTA, F.R.E.S.; 257, Msida Street, B'Kara, Malta.

EUMENIS SEMELE AT WIMBLEDON.—During a walk on Wimbledon Common this morning I was delighted to observe three *Eumenis semele* (2 males and 1 female) feeding on flowers of ling. This is the first time I have seen this butterfly on the Common and I hope it may establish itself. Incidentally the patches of heather and ling on the Common have increased greatly of late years, and there are now many fine "purple patches" to be seen.—P. A. CARDEW (Col.); 21A, Thornton Hill, Wimbledon, S.W. 19.

SECOND BROOD LAOTHOË POPULI.—I reared eight separate batches from ova laid in 1947 by the first-brood moths. From the 1st batch one female emerged on August 20, 1947; from the 2nd batch one male emerged on August 10, 1947, one male emerged on the 11th, three females emerged on the 12th, one female emerged on the 14th, one male emerged on the 16th, and one male emerged on the 17th; from the 4th batch one female emerged on the 20th: and from the 6th batch one male emerged on the 19th. Further moths have emerged from the same batches during May and June, 1948. All my larvae were fed on poplar.—M. P. GOOSEMAN; 28, Westfield Road, Barton-on-Humber, Lincs.

ABUNDANCE OF ORIA MUSCULOSA IN 1948.—On July 28 during the great heat wave I made a short visit to the Salisbury area. I came across a wheat field to the north of the town in the process of being cut and found *Oria musculosa* flying out in all directions, also at rest on the corn stems and in the cut sheaves. I do not remember having seen this species so numerous. It was not difficult to take half a dozen at a time, and interesting to note the predominance of females, many of which were kept for breeding.—C. G. M. DE WORMS.

EUROIS OCCULTA IN MIDDLESEX.—I took a male specimen of the pale grey form of *Eurois occulta* at sugar at 10 p.m. in my garden on August 20.—HAROLD KING; Gavarnie, Wise Lane, Mill Hill, N.W.7.

THE VISION OF MACROGLOSSUM STELLATARUM.—Towards the end of the second week in April, 1948, my sister watched a Humming-bird Hawk Moth visiting two window-boxes at her London flat. The boxes, situated on the top floor of a high house in Evelyn Gardens, Kensington, were planted with brightly coloured orange and yellow Primulas. They faced the street side of the house, with the opposite houses as tall as the one in question. My sister's Primulas were the only flowers in that street, but even so, what a small target to find! The moth drank greedily at every open flower in turn and stayed about twenty minutes.—CYNTHIA LONGFIELD, F.R.E.S.

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THE IDENTITY OF *PULEX METALLESCENS* KOLENATI 1856.

BY G. H. E. HOPKINS, M.A., F.R.E.S.

KOLENATI (1856, p. 33) described a *Pulex metallescens* which Jordan and Rothschild (1920, p. 63) suggested was "probably a species of *Archaeopsylla*, and possibly the same as *A. erinacei maura* J. & R. (1911). It is best treated as a distinct species of *Archaeopsylla* until Egyptian specimens come to hand."

The entire original description of *P. metallescens* is that it is "Bronzefarbig-glänzend, tief rothschwarzbraun, goldgelb beborstet, die Füsse lichter, die Hals- und ersten Leibesringe breit- bronzegelb-eingefasst, die Coxen schwarzbraun gerandet, die vorderen in Reihen punktirt. Lange: 0,0029 Pariser Meter. Aufenthalt: Am ägyptischen Flederhunde Pteropus aegyptiacus." In 1863 (p. 30, pl. 1, fig. 1) Kolenati gives a slightly extended description, and on this occasion mentions (and figures) for the first time a pronotal comb consisting of "5 starken, nicht sehr langen Zähnen"; he also states that the species occurs in Egypt in warehouses, that he once got a single specimen from a skin of *Xantharpyia aegyptiaca* Geoffroy, and that the specimens are in his original collection. This collection was presented (see Rothschild, 1911*b*, p. 48) to the Paris Museum, but Kolenati's specimens of *P. metallescens* are no longer there (see Rothschild, 1911*a*), and must be considered lost. *Pteropus aegyptiacus* and *Xantharpyia aegyptiaca* are different names for the same animal, now known as *Rousettus aegyptiacus* (E. Geoffroy), and there is no doubt that the single specimen from a skin of this host was the type of *metallescens* because it was the only specimen mentioned by Kolenati in 1856.

Coming to the identity of *P. metallescens*, the figure published by Kolenati in 1863 almost certainly represents an *Archaeopsylla*, but there is much less certainty that it represents *P. metallescens* Kolenati 1856, and not new (and misdetermined) material. There is nothing in the original description to suggest that *metallescens* was not *Pulex irritans*, and that the 1863 figure was not taken from one of the specimens obtained from warehouses; Kolenati's methods (see Rothschild, 1911*b*, p. 51) make this distinctly possible, and I would have felt much disposed to make this assumption but for the fact that *Archaeopsylla* is not a very likely inhabitant of warehouses, whereas it is just as likely as any other common flea to be found accidentally on the skin of a bat. This consideration makes it seem best to assume that Kolenati's figure was taken from the type of *metallescens* and that the comb was overlooked in 1856, but it is obviously desirable that a name whose application is as uncertain as that of *P. metallescens* should be safely tucked away in synonymy if that is possible. Fortunately there is an easy way of doing this in the present instance.

It has been assumed that *P. metallescens* was collected in Egypt from *Rousettus aegyptiacus*, and this assumption is fully justified by the information given by Kolenati in 1856, but the basis for it is entirely destroyed by the additional facts he gives in 1863, for it then appears that the flea was a single specimen not collected from the bat but from a skin of the latter—an essential difference—and therefore by no means necessarily in Egypt, so that there is no longer any reason to assume that the flea was Egyptian.*

In these circumstances it is entirely possible that the flea was from central Europe and belonged to the common form of *Archaeopsylla* found there, and there is nothing whatever in the two descriptions that forbids this assumption. I therefore assume that the flea was a specimen from central Europe that had accidentally been transferred to the skin of the Egyptian bat, and I place *Pulex metallescens* Kolenati 1856 as a synonym of *Archaeopsylla erinacei erinacei* (Bouché) 1835.

REFERENCES.

JORDAN and ROTHSCHILD (1920), "On the species and genera of Siphonaptera described by Kolenati," *Ectoparasites*, 1 : 61–64.

KOLENATI (1856), *Die Parasiten der Chiroptern*. Brünn.

Idem (1863), "Beiträge zur Kenntniss der Phthirio-Myiarien," *Horae Soc. ent. ross.*, 2 : 11–109.

ROTHSCHILD (1911*a*), "Liste des Siphonaptera du Muséum d'Histoire Naturelle de Paris, accompagnée de descriptions des espèces nouvelles," *Ann. Sci. nat., Zoologie* (9), 12 : 203–216.

Idem (1911*b*), "On the Bat-fleas described by Kolenati," *Novit. Zool.*, 18 : 48–56.

MELITAEA MEROPE CAPTURED BY A FROG.—While wandering in the damp hollows at the top of the Simplon Pass on July 14 I saw an example of *M. merope* alight on a stem of *Vaccinium*. On the instant a large frog sprang at the butterfly and simply engulfed it. These damp hollows on the Simplon are full of these large frogs and I think they must be regarded as really formidable enemies of butterflies. They are probably the principal enemies, for there are very few birds at that altitude.—J. G. SIMES ; 75, Queens Road, Loughton, Essex.

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* Mallophaga have a much closer attachment to their host, both in life and after death, than have normal fleas, yet I possess specimens of Neotropical Mallophaga taken from the skin of an Ethiopian host.

MALLOPHAGAN SYNOPSIS XVIII. GENUS *FALCOPHILUS*.

BY WOLFDIETRICH EICHLER, DR.RER.NAT.

THE genus *Falcophilus* was described by L. R. Guimarães, in his paper "Novos Generos de Malófagos Parasitas de Falconiformes," which appeared in 1942 (*Pap. avulsos Dep. Zool. S. Paulo*, **2**: 241). *Falcophilus* is synonymous with my genus *Vulturiphilus*, which I had named in an article on Peruvian Mallophaga which has not yet appeared because of the war. I used the name *Vulturiphilus* as a manuscript name on p. 59 of my mimeographed *Phthirapterarum Mundi Catalogus* (annex to *Acta Mallophagologica*) and mentioned it as belonging to the Cuculiphilinae when erecting this subfamily in 1944, in my paper "Notulae Mallophagologicae. X. *Anseriphilus* nov. gen. und andere Neuerungen bei Amblyceren Federlingen" (*Dtsch. ent. Z.*, 1943 : 60). The following species should be referred to the genus *Falcophilus*.

1. *alternatus* Osborn 1902*a* (*Ohio Nat.*, **2**: 175, pl. xi, fig. 1) on *Cathartes aura* Linn. (probably subsp. *septentrionalis* Wied.)

This species is the genotype of *Falcophilus*.

2. *coragypsis* nov. spec. on *Coragyps atratus foetens* Lichtenst.

The types of my new species, which would have been the genotype of *Vulturiphilus*, were collected by E. Titschack on March 31, 1936, near Hacienda Huayuri (South Peru) on "Gallinazo." They are numbered WEC 1700, and will be deposited in the Hamburg Zoological Museum.

When my specimens are compared with *fasciatus*, they show a broader and more flattened forehead. The abdominal hooks on the seventh tergite of the male average 13 on each side and are irregularly situated.

I have seen some other specimens from the same host which undoubtedly belong to the same species, namely :

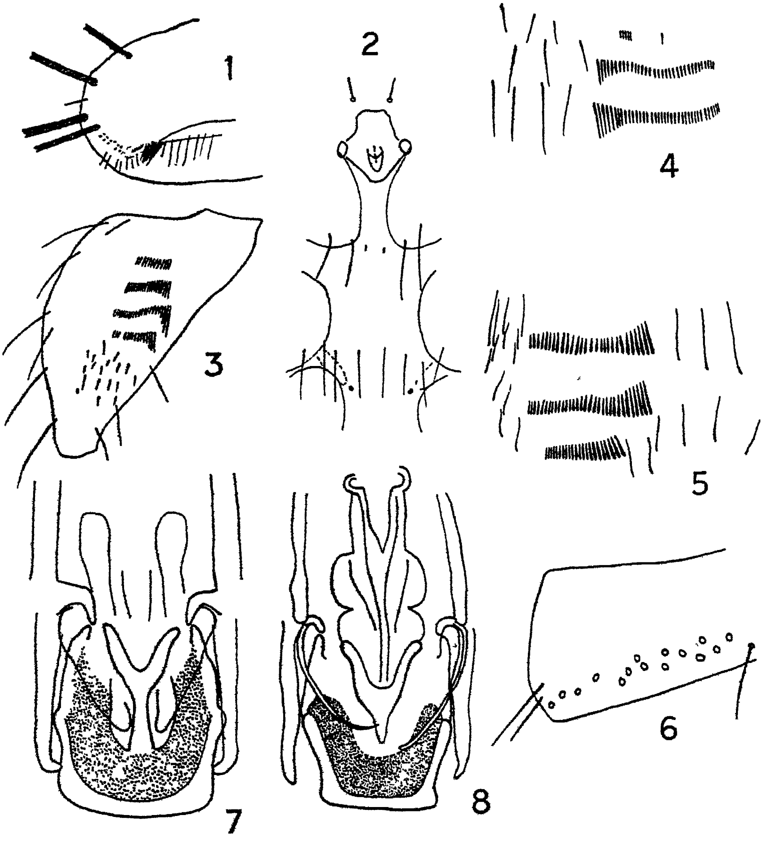
(*a*) Slides WEC 457, 458 and 1562 on "Zschulo" at Pandi (Cundinamarca, western side of Eastern Cordillera, Colombia) ; *W. Fritzsche*, in Hamburg Zoological Museum.

(*b*) Slide WEC 2204 on "*Cathartes urubu*" (= *Coragyps atratus*) at Iquique ; Berlin Zoological Museum.

(*c*) Slide WEC 2388 on "*Cathartes atratus*" at San Bernardino (Paraguay), –.viii.1904 ; K. Fiebrig S. V., in Berlin Zoological Museum.

When comparing all my material I find that the combs on the underside of the hind femora may sometimes be 5 instead of 4 (one specimen had 5 on the left and 4 on the right leg). Fig. 4

shows the combs of the underside of the third sternite of a female with three rows of spines; the short first row is rarely to be seen in most of the specimens. Fig. 5 shows the arrangement of the combs on the fourth sternite as it is normally to be found; in some



FIGS. 1–8.—(1) Underside of right temporal lobe of female *Falcophilus coragypsis* nov. spec. (slide WEC 1700c) drawn from above. (2) Sternal region of female *Falcophilus coragypsis* nov. spec. (slide WEC 2388). (3) Underside of left hind femur of female *Falcophilus coragypsis* nov. spec. (slide WEC 1700c) drawn from above. (4) Underside of right side of third abdominal segment of female *Falcophilus coragypsis* nov. spec. (slide WEC 1700c) drawn from above. (5) Underside of right side of fourth abdominal segment of female *Falcophilus coragypsis* nov. spec. (slide WEC 1700c) drawn from above. (6) Underside of right side of seventh abdominal segment of *Falcophilus coragypsis* nov. spec. (slide WEC 2388) drawn from beneath. (7) Male genital armature of *Falcophilus coragypsis* nov. spec. (slide WEC 457). (8) Male genital armature of *Falcophilus fasciatus* (slide WEC 1242).

cases the first row may be divided, or from the outer side may be inserted a short row of spines between the second and third regular combs.

Guimarães (1942, p. 244, figs. 10–13) described and figured specimens from the same host (from São Paulo and Rio de Janeiro) under the name of *alternatus* Osborn, and Peters has referred to this name specimens from *Coragyps atratus atratus* Meyer from eastern U.S.A. I think that these authors did not have *alternatus* Osborn but my above-described new species. I have not seen true *alternatus*, but the specific difference is obvious from comparing Osborn's figures (e.g. of the male genitalia) and from the difference in host.

3. *cathartae-papae* Nitzsch, 1861 (*Z. ges. NatWiss.*, **17** : 518) on *Sarcorhamphus papa.*

I have not seen specimens of this species, renamed *breviceps* by Giebel in 1874 (*Insecta epizoa* : 279), but it has been described and figured by Carriker (1903, *Univ. Stud. Neb.*, **3** : 180, pl. viii, fig. 4) under the misdetermination *fasciatum* Rudow.

4. *fasciatus* Rudow 1869 (*Z. ges. NatWiss.*, **34** : 403) is from *Vultur gryphus* Linn., but Giebel wrongly gave the host as *Sarcorhamphus papa*, and this mistake has been copied by all later authors. Piaget (1885, *Pédiculines Supplément*, 152, pl. xvi, fig. 6) redescribed the species as *zonatus*, and Harrison (1916, *Parasitology*, **9** : 36) gave the new name *fasciaferum* to Rudow's species which he thought to be preoccupied by *Menopon fasciatum* Scopoli (described as a *Pediculus* and now in *Cuculiphilus*).

I have seen specimens from this host (slide WEC 1242 of the Hamburg Zoological Museum, collected in 1903 at Arica, Chile, by R. Paessler) which I identify with Rudow's and Piaget's species. They are very similar to *coragypsis*, but the abdominal hooks of the seventh tergite of the male are only 6 to 7 on each side, arranged in a straight line. Also the male genital armature is different, as shown in Fig. 8.

The description of *Menopon gryphus* Giebel does not fit this species and *gypsis* is probably not a *Falcophilus*.

5. *punctatus* Gervais, in Gay 1849*a* (*Hist. fis. Chile*, **4** : 104). As Hopkins has pointed out in a note which he is about to publish and to which he kindly permits me to refer, this species is not a *Laemobothrion*, as authors have followed Piaget in stating (compare my Mallophagen-Synopsis. III : Genus *Laemobothrion*, 1942*d*, *Zool. Anz.*, **137** : 52–63), but a *Falcophilus*. Unfortunately we cannot but agree with Hopkins that a closer identification of the species is impossible unless the type should survive, because no proper host-record is given (". . . on hawks, and I think I have also collected it on a condor ").

SOUND PRODUCTION IN LEPIDOPTEROUS PUPAE.

By H. E. Hinton, Ph.D.

Department of Entomology, British Museum (Natural History).

With 8 Text-figures.

In this paper a number of scattered records of lepidopterous pupae that produce sound of one kind or another are brought together, and a number of species in which I have found stridulating organs are recorded for the first time. Records of pupae that stridulate are usually imbedded, if not entombed, in discussions on other subjects, so that I do not for an instant suppose that I have been able to find most of those that must exist. In the preparation of this paper, the pupae of more than 700 species have been examined, of which a large proportion were from the T. R. D. Bell collection now in the British Museum.

I. Body Knocked Against Substrate or Walls of Pupal Cell.

The pupae of a number of Hesperiidae and a few Lycaenidae make a sound audible to humans by knocking their bodies against the leaves or other objects to which they are attached or against the walls of their pupal cells. These pupae apparently have no structural modifications associated with their habit of making a knocking or rattling sound. Their method of producing sound belongs to the same category as that of the well known death-watch beetle although the function of the sound is different. Further experiments with living pupae are necessary to show if the sound produced is merely incidental to the wriggling of the pupa or whether one of the functions of the wriggling is to produce sound. The species that are known to produce a rattling or knocking sound when suitably stimulated are listed in Table I.

Table I.—*Lepidopterous pupae which make a noise by hammering against the substrate or the walls of their pupal cell.*

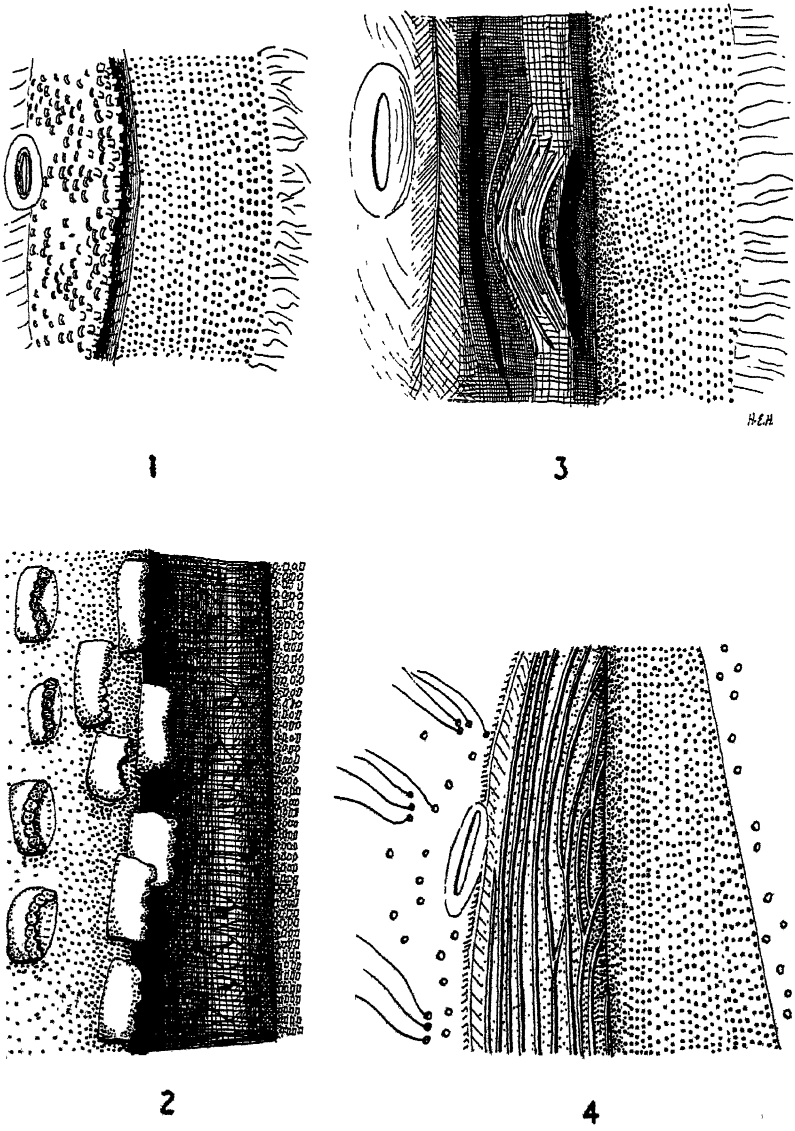
Species.	Distribution.	Authority.
Hesperiidae (Hesperiinae)		
Matapa druna Moore	Java	Piepers & Snellen (1910)
,, *aria* Moore	India	Bell (1925)
Erionota thrax L.	Java	Piepers & Snellen (1910)
,, *lebadea* Hew	Java	Piepers & Snellen (1910)
Hidari irava Moore	Malaya	(W. H. Evans)
Eetion elia Hew.	Malaya	(A. S. Corbet)
Gangara thyrsis F.	Oriental	Bell (1925)
Lycaenidae (Theclinae)		
Arhopala centaurus F.	India	Bell (1919)
Argiolaus silas crawshayi Butl.	Africa	Jackson (1937)

The pupa of *Eetion elia*, like that of *Unkana ambasa* Moore, which is not recorded as making a noise, has three very high oblique ridges on the tenth abdominal segment. It is possible that these ridges may play a part in producing sound. Of the pupa of *Argiolaus s. crawshayi* Jackson (1937, p. 214) says, "When alarmed the pupa will hammer rapidly on the leaf with its head-case, making quite sufficient noise to frighten away a small predator." *Gangara thyrsis* also produces sound by rubbing ridges on the fifth abdominal segment against the proboscis.

II. One or More Pairs of Abdominal Segments Rubbed Together.

The production of sound by rubbing one or more pairs of abdominal segments together is apparently the most common and widely distributed method used by lepidopterous pupae. The stridulating or sound producing organs consist typically of coarse transverse ridges on the anterior margin of one segment and fine or very fine tubercles on the posterior margin of the segment immediately in front. When these are rubbed together sound is produced. In the Lycaenidae both parts of the organ, which is between segments five and six, consist of rows of tubercles. In some Sphingidae, *Macroglossum* spp. (Figs. 1–2) and *Theretra latreillei lucasi* Walk., the stridulatory surfaces also consist of tubercles. In these genera it is the anterior margin of the fifth abdominal segment which is coarsely tuberculate, and the posterior margin of the fourth which is very finely tuberculate. In all other species listed in Table II, including other Sphingidae, the stridulating apparatus is on segments 4–5, 5–6, and 6–7, and the posterior surface is in each case transversely ridged (Figs. 3–4). The stridulating ridges may be confined to the dorsal part of the segments (e.g. *Margaronia laticostalis* Guenée), dorsum and sides (e.g. *Lymantria ampla* Walk.), sides only (e.g. most Sphingidae), or sides and ventrum (e.g. *Gargetta viridigrisea* Dudgeon).

Several species of *Celaenorrhinus* were examined but stridulating organs were found only in the three listed in Table II. According to Bell (1923, p. 435), the pupa of *C. ambareesa* "does not seem to emit any sound when disturbed." The pupa of this species has such well developed stridulating organs that I have little doubt that further experiments will show that it does stridulate. Bell's comment on *C. ambareesa* is curious because, in his work on the butterflies of India, it is the only negative statement on sound production: when he has heard a pupa stridulate he says so, but in no other instance does he make a statement that the pupa does not stridulate.



Figs. 1–4.—(1) Stridulatory surfaces of the fourth and fifth abdominal segments of the pupa of *Macroglossum corythus* Walk. (2) Greatly enlarged view of same. (3) Stridulatory surfaces of the fourth and fifth abdominal segments of the pupa of *Acherontia atropos* L. (4) same of *Lymantria viola* Swinhoe.

TABLE II.—*Lepidopterous pupae that have been heard to stridulate and those in which stridulatory organs have been found. Of the species known to produce sound, I have examined only those marked with an asterisk, and stridulatory organs have been found in each.*

Species.	Family.	Authority.
Margaronia laticostalis Guenée	Pyralidae (Pyraustinae)	—
Celaenorrhinus leucocera Kollar	Hesperiidae (Pyrginae)	—
,, *ruficornis fusca* Hamps.	,, ,,	—
,, *ambareesa* Moore	,, ,,	—
Thecla quercus L.	Lycaenidae (Theclinae)	Prell (1913)
Strymonidia spini Schiff.	,, ,,	,, (1913)
Callophrys rubi L.	,, ,,	Schild (1877)
Pratapa blanka de Niceville	,, ,,	Bell (1919, p. 461)
,, *deva* Moore	,, ,,	,, (1919, p. 467)
Rapala manea Hewitson	,, ,,	,, (1920, p. 945)
,, *varuna* Horsf.	,, ,,	,, (1920, p. 948)
Curetis thetis Drury	,, ,,	,, (1919, p. 138)
Rathinda amor F.	,, ,,	,, (1919, p. 758)
Jamides celeno Cramer	,, (Lycaeninae)	,, (1918, p. 107)
Allotinus horsfieldi Moore	,, (Miletinae)	(W. Roepke)
Plusia chalcites Esper	Phalaenidae (Plusiinae)	—
Prodenia litura F.	,, (Acronyctinae)	—
Lymantria ampla Walk.	Lymantriidae	—
,, *viola* Swinhoe	,,	—
Tetragonus catamitus Geyer	Callidulidae	—
Gargetta viridigrisea Dudgeon	Notodontidae	—
Acherontia atropos L.*	Sphingidae (Acherontiinae)	Many authors
Meganoton nyctiphanes Walk.	,, ,,	Bell & Scott (1937)
Clanis titan Roths. & Jord.	,, (Ambulicinae)	,, ,,
Compsogene panopus Cramer	,, ,,	—
Angonyx testacea Walk.	,, (Philampelinae)	,, ,,
Cizara sculpta Feld.*	,, ,,	,, ,,
Macroglossum insipida Butl.	,, ,,	,, ,,
,, *assimilis* Swains.	,, ,,	—
,, *corythus* Walk.	,, ,,	—
,, *fringilla* Boisd.	,, ,,	—
Theretra latreillei lucasi Walk.	,, (Choerocampinae)	—

In many Sphingidae, e.g. *Sphinx* spp., *Platysphinx piabilis* Dist., *Protoparce sexta* Johann., *Cephonodes hylas* L., there are distinct gin-traps† between segments 4–5, 5–6 and 6–7. The posterior part of these usually consists of two or more widely

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† I have discussed the function of gin-traps in a previous paper (Hinton, 1946*a*).

separated transverse ridges in front of which, on the same segment, is often a large, transversely oval depression. It is possible that in some species which have several transverse ridges these may function both as gin-traps and stridulatory files. *Cizara sculpta* Feld. has been heard to stridulate, but the ridges are almost as far apart as in species which definitely do not stridulate, and in which the ridges constitute the posterior part of a gin-trap.

In the Sphingidae the transverse ridges are always in front of the spiracles of segments 5–7. Some writers believe that these ridges are used by the adults to propel themselves to the surface of the ground while they are still enclosed within the pupal cuticle. From their direction and their position well below the general level of the surface of the abdomen, it seems most unlikely that these ridges can be used in any such way by the enclosed moth. The pharate adult probably propels itself, if indeed it does not emerge beneath the surface, with the cremaster to the surface when about to emerge, as do some Notodontidae, e.g. *Datana*.

Some writers have said that the pupa of *Acherontia atropos* L. is able to stridulate. Other writers claim that the sound heard is produced only by the pharate adult. This controversy is summarized by Tutt (1904, p. 432), who comes to the conclusion that the pupa does not stridulate and that those who claimed it did were, in fact, hearing the sound produced by the enclosed adult, which makes a noise audible to humans by blowing air which vibrates a flap in its oral cavity. Well developed stridulatory files, as shown in Fig. 3, are present in front of the spiracles of segments 5–7. So far as is known, the pharate adult is always able to move its abdomen in such a way that it produces sound by means of the stridulatory surfaces of the pupa. It therefore seems likely that the pharate adult of *A. atropos* will be found to produce sound in two different ways: by vibrating a flap in its oral cavity, and by rubbing together the stridulatory surfaces of the effete pupal cuticle.

III. Abdomen Rubbed Against Proboscis.

The pupa of *Gangara thyrsis* F. is the only lepidopterous pupa that is known to stridulate by rubbing ridges on its abdomen against its proboscis. On either side of the middle of the fifth abdominal segment is a very sharp transverse ridge which is high and perpendicular to the surface. Each ridge is curved so that its middle part is highest. The proboscis, which in this species is exceptionally long and extends far beyond the end of the abdomen, lies between and partly resting on the mesal part of the two ridges. When the abdomen is moved, these abdominal ridges scrape across the transverse ridges on the underside of the proboscis, and, according to Bell (1925, p. 583), a " hissing sound " is produced.

The pupa is enclosed in a spirally coiled cylinder made of palm leaf. When suitably stimulated, it not only stridulates, as stated above, but also makes a loud rattling noise against the walls of its pupal cell by shaking itself violently up and down as well as sideways.

IV. Ridges or Tubercles of Pupa Rubbed Against Walls of Cocoon.

Stridulating organs consisting of ridges or tubercles or both that scrape against the inside walls of cocoons of stiff parchment-like silk have been found in all of the 26 species of the Phalaenid subfamilies Sarrothripinae and Careinae that have been examined. These species may be placed in two groups on easily distinguishable differences in the structure of the cocoon: (1) cocoons without ridges on the inside wall and with a definite, vertical anterior escape valve, as in many Sarrothripinae and all Careinae; and (2) cocoons with ridges on one or both ends of inside wall and without a definite escape valve, as in some Sarrothripinae.

A. *Cocoons Without Ridges on Inside Wall.*

The species which have no distinct ridges on the cocoon are listed in Table III. I have had only one of these alive (*Pseudoips bicolorana* Fuessly) and I have already recorded the fact that it stridulates (Hinton, 1946*a*). When its cocoon is touched, the pupa stridulates very audibly and can be heard several feet away. Pupae of the other species listed in Table III are assumed to stridulate because they possess similar cuticular processes and similar cocoons. The assumption that these pupae stridulate is also supported by the following observations.

1. In the Sarrothripinae and Careinae the pupal case remains entirely within the cocoon when the moth emerges. Other pupae which are enclosed within cocoons and have spines or tubercles do not have these processes at right angles to the surface. If they are directed posteriorly, as in most Microlepidoptera and the Zygaenidae and Cochlidiidae, the pupal cuticle is always partly extruded from the cocoon when the moth emerges. If some anteriorly directed spines are also present, it has been found that they are thrown out of action when the moth is moving forwards but engage the fabric of the cocoon when the pupal case has been protruded a certain distance. These anteriorly directed spines anchor the pupal case to the cocoon and prevent the moth from dragging it out completely.

2. Pupae that are enclosed in cocoons and do not have spines remain within the cocoon when the moth emerges. These pupae are more or less smooth and never have the surface sculpture of the Sarrothripinae and Careinae. This is true also of other Phalaenid subfamilies in which, as in the Sarrothripinae and Careinae, the pupal cuticle is rigid and cannot be pulled through the narrow escape valve of the cocoon by the moth as it emerges.

3. Pupae of many of the Sarrothripinae and Careinae (see Table III) have ridges on the tenth abdominal segment that are almost exactly like the scraper of the stridulatory organ of those Sarrothripinae that have the file on the inside wall of the cocoon.

A detailed description of each species is not relevant to the present study, but certain features of sculpturing common to most may be briefly mentioned. In all species the dorsal areas of the head, thorax, and part or all of the abdomen are more or less densely set with small to moderately large erect tubercles. In some species many of the tubercles are distinctly flat-topped. The ventral and ventro-lateral areas are smooth except for the fifth abdominal sternum which, except in *Risoba basalis* Moore, has tubercles as large as those of the fifth tergum but sparser. The

TABLE III.—*The Sarrothripinae and Careinae examined that have no ridges on the inside wall of the cocoon.*

Species.	Subfamily.	Distribution.	Ridges on 10th abdominal segment.
Labanda fasciata Walk.	Sarrothripinae	India, Burma	7
,, *semipars* Walk.	,,	India	27
,, sp.	,,	,,	22
,, sp.	,,	,,	not counted
Blenina metascia Hamps.	,,	,,	80
,, *donans* Walk.	,,	India, East Indies	43
,, *quinaria* Moore	,,	China, Assam	not counted
Symitha molallela Walk.	,,	Ceylon	6–8
Risoba basalis Moore	,,	Oriental	none
Characoma stictigrapta Hamps.	,,	Gold Coast	22–26
Carea angulata F.	Careinae	India, Java, Celebes.	none
,, *chlorostigma* Hamps.	,,	India, Borneo	none
Gariga mirabile Swinh.	,,	Oriental	25
Maurilia saturata Walk.	,,	Ceylon	none
Aiteta truncata Walk.	,,	India	no record kept
Beara dichromella Walk.	,,	India	none
Paracrama dulcissima Walk.	,,	Indo-Australian	26
Pseudoips bicolorana Fuessly	,,	Europe	12
Halias prasinana L.	,,	,,	none

dorsal tuberculate areas are often narrow, but whether wide or narrow, are sharply contrasted with the smooth lateral and ventral areas, as there is no obvious zone of transition between the two. The species which have longitudinal ridges on the tenth abdominal segment are indicated in Table III. These ridges may extend most of the way around the segment or may be confined to the dorsal or lateral parts or both. They may be very well developed or low and irregular as in *Pseudoips bicolorana*. *Risoba basalis* is unusual in having the dorsal posterior margin of the seventh abdominal segment distinctly elevated and armed with especially long vertical tubercles. In *Paracrama dulcissima* the sculpture of the dorsal surface consists of prominent wrinkles rather than tubercles.

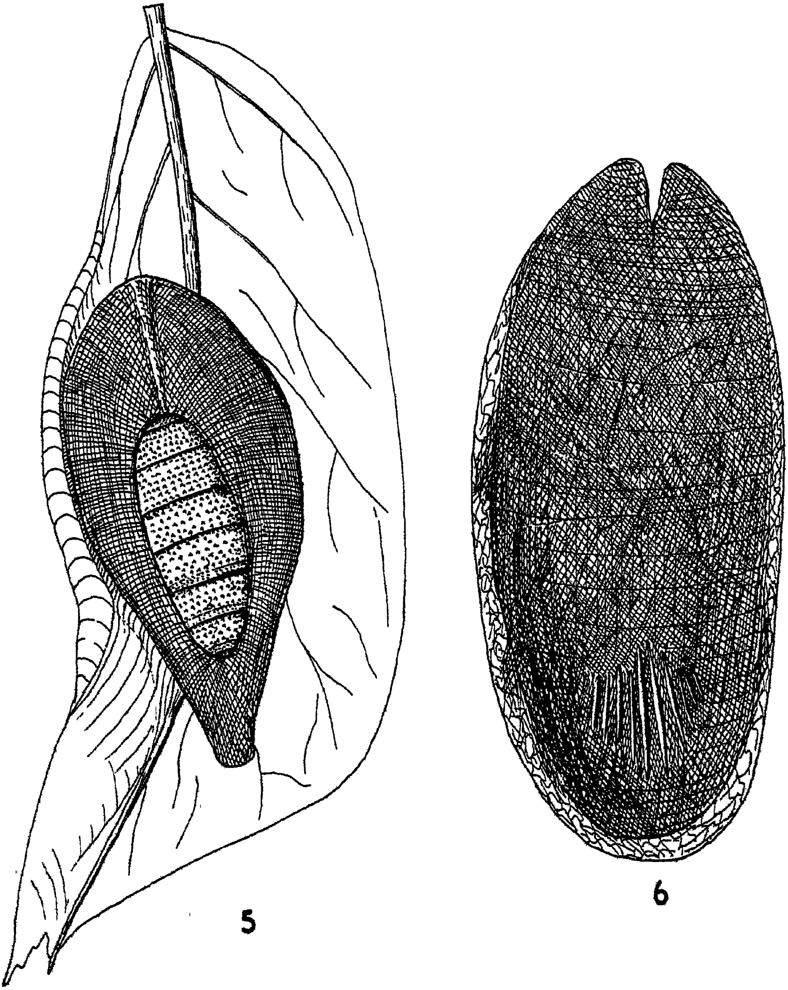
The pupae of *Carea angulata* F. and *Labanda* sp. have median dorsal gin-traps between segments 4–5, 5–6 and 6–7. The cocoon (Fig. 5) of *Labanda fasciata* Walk., which is sulphur-yellow, is most unusual in that it is constructed with a large oval opening in its dorsal side so that the dorsal parts of the first six abdominal segments of the pupa are exposed. The vertical tubercles on the exposed parts of these segments are longer and stouter than those elsewhere. The moth does not escape through this opening but through the anterior escape valve, which, as usual, has its long axis vertical.

B. *Cocoons with Ridges on Inside Wall.*

The caterpillars of some genera of the Phalaenid subfamily Sarrothripinae construct longitudinal ridges of silk on the dorsal inside wall of the cocoon near its posterior end (Figs. 6–7). These ridges, which become very hard, are so placed that when the pupa is formed they are above the tenth abdominal segment of the latter. On the dorsal surface of the tenth segment of the pupa there is a transverse row of many relatively short ridges (Fig. 8). Both the pupa and pharate adult are able to wriggle in a manner that scrapes the ridges on the pupal cuticle across those previously constructed by the larva on the inside of the cocoon. When the pupal ridges are rubbed against those on the cocoon a loud sound is produced.

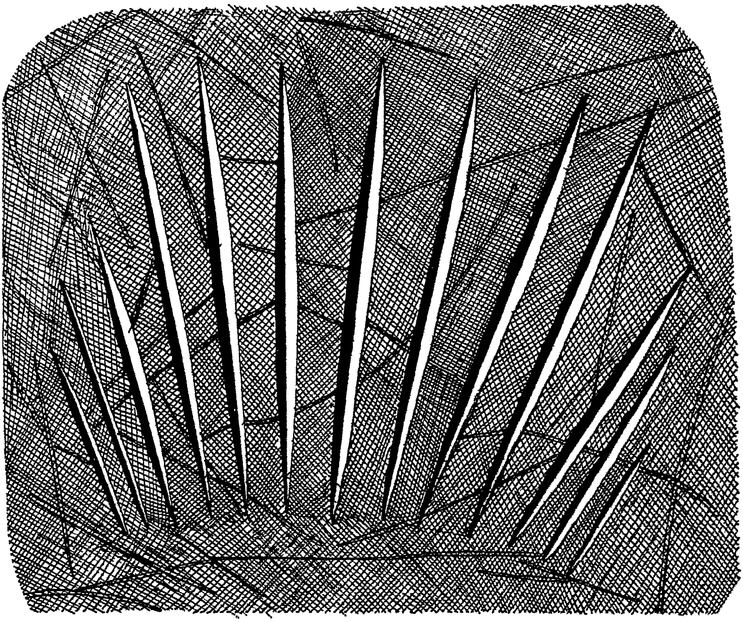
The first record of this method of sound production appears to be that of Fletcher (1919), who described and illustrated the sound producing ridges on the pupa and cocoon of *Eligma narcissus* Cr., which he observed at Coimbatore, India. Hemmingsen (1947), to whom Fletcher's paper was unknown, observed the same species at Peitaiho Beach, North China. The sound produced by the pupa is described by Hemmingsen as, " a stridulating sound produced at a somewhat slower rate than the grasshopper calls usually heard there. Also the tone was more hissing."

I have found seven other species of Sarrothripinae that have a stridulating apparatus consisting of ridges inside the cocoon and ridges on the tenth abdominal segment of the pupa. In one species,



Figs. 5–6.—(5) Cocoon of *Labanda fasciata* Walk. Part of the pupa is visible through the dorsal opening. (6) Inner dorsal side of cocoon of *Selepa celtis* Moore.

Gadirtha pulchra Butler, there is a ridged surface at both ends of the cocoon. There is surprisingly little interspecific variation in



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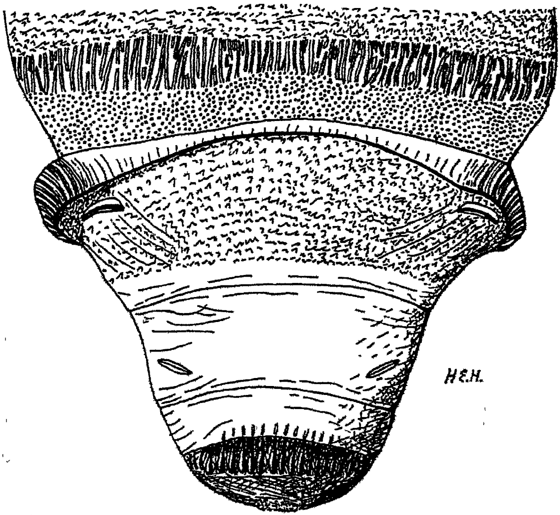

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FIGS. 7–8.—(7) Silken cocoon file of *Eligma hypsoides* Walk. (8) End of abdomen of the pupa of the same species, drawn to the same scale.

the number of ridges or their length in relation to the length of the cocoon. The intraspecific variation in the number of ridges is greater than the variation between species, as shown in Table IV.

In the Sarrothripinae which possess this type of stridulating apparatus the three posterior abdominal segments of the pupa are relatively narrower than in related forms that do not have ridges on the cocoon (Fig. 8). Owing to this constriction the possible distance through which the tip of the abdomen may travel sideways is increased.

TABLE IV.—*Variation in the number of ridges in the cocoon and on the tenth abdominal segment of the pupa in some Sarrothripinae.*

Species.	Distribution.	Cocoons.			Pupae.	
		No.	Post.	Ant.	No.	10th seg.
Eligma narcissus Cr.	Oriental	19	8–18*	none	1	20†
,, *hypsoides* Walk.	West Africa	1	13	,,	1	16
Selepa spurcata Walk.	India, New Guinea	1	12	,,	1	24
,, *celtis* Moore	Indo-Australian	7	7–9	,,	3	34–42
,, sp.	India	6	12–14	,,	1	36 ±
Plotheia decrescens Walk.	India	1	7	,,	1	32 ±
Iscadia aperta Walk.	C. & S. America	1	12	,,	1	35
Gadirtha pulchra Butl.	Indo-Australian	5	10–14	10–13	1	11

* From Fletcher (1919) and Hemmingsen (1947).
† From the illustration in Fletcher (1919).

The possession of ridges at both ends of the cocoon in *Gadirtha pulchra*, is most curious, as there are no ridges or other kind of scrapers on the thorax or head of the pupa. In the other seven species listed in Table IV, the posterior end of the cocoon differs from the anterior in being slightly narrower and in being slightly more strongly constructed, the moth on emergence breaking through the flimsy anterior end of the cocoon. In *Gadirtha pulchra* the two ends of the cocoon are similar in breadth and both are equally flimsy. In all other species the posterior end of the pupa was always found in the narrow end of the cocoon that had the ridges. The degree of rigidity of the pupa and the ratio between its length and the diameter of the cocoon are such that there is no possibility of the pupa reversing its orientation within the cocoon. From this it follows that the orientation of the pupa in the cocoon is always the same as that of the larva immediately before pupation. Since no case was found of a pupa with its posterior end in the anterior end of the cocoon, it follows that most, if not all, larvae orientate themselves at some period after the completion of the cocoon so that their anal end is contained in the part that has the ridges. The pupa of any larva that had reversed its usual orientation in the cocoon would be unable to stridulate and the subsequently formed imago would be unable to escape. The five available cocoons of *Gadirtha pulchra* had ridges at both ends. In this species there is, therefore, unlike the other seven, no relation between the orientation of the larva and the ability of the subsequently formed pupa to stridulate. The freedom of orientation within the cocoon gained by the larva of *Gadirtha pulchra* by constructing ridges and an escape apparatus at both ends may have some selective value either in the larval, pupal or adult stages, or all three.

From Table IV it appears that there is no close correlation between the number of ridges on the pupa and those on the cocoon. In some of these species, e.g. *G. pulchra* and *I. aperta*, there are no ridges elsewhere on the pupa. In *Selepa spurcata* and *S. celtis* there are distinct but wavy and irregular ridges on the ventropleural region of the fifth to eighth abdominal segments and more regular longitudinal ridges on the sterni of the fifth and sixth segments. In the pupa of *Eligma hypsoides* there is a transverse row of longitudinal ridges on the side of the anterior margin of the fifth to seventh abdominal segments. These ridges are short and somewhat similar to the dorsal ridges of the tenth segment. The sides of the segments on which they occur project beyond the general surface of the cuticle. In addition, there is a transverse row of longitudinal ridges on the posterior dorsal margin of the fourth to sixth abdominal segments. Probably some kind of sound is made by scraping these accessory ridges against the walls of the cocoon even though there are no ridges on those parts of the cocoon against which they scrape.

The pupae of the Sarrothripinae which build ridges in their cocoons, either have ridges on other segments besides the tenth abdominal or are smooth. They never have the erect tubercles of the Sarrothripinae and Careinae that do not build a file in their cocoons. At first sight it might appear that species with a cocoon file are not only more specialized but can be derived from species that stridulate and have no cocoon file. But the species with a cocoon file have in other respects a distinctly more primitive type of cocoon which is more like the typical Phalaenid cocoon. The cocoon has a simpler shape, is not of parchment-like silk, is never strongly coloured, and the escape apparatus is of a simpler and more primitive type. The escape apparatus consists only of a weak area at the anterior end (both ends in *Gadirtha pulchra* Butl.) through which the moth breaks when it emerges, whereas the species without a cocoon file have a definite valve with its long axis vertical and its two lips weakly stuck together. The cocoons with a file are of greyish silk on which is usually stuck bits of bark of the branch to which they are secured, so that they closely resemble the adjacent parts of the bark. Those without a file are frequently green or yellow and attached to leaves. If greyish or whitish they are often on twigs and resemble buds, thorns, or broken twigs, but none of the species seen had bits of bark stuck to their surfaces.

There can be little doubt that the species with the highly-coloured parchment-like cocoons of a complex and often bizarre form are derived from species that had weaker and simpler cocoons of greyish silk. For this reason, the species with a cocoon file cannot be derived from forms like the recent Sarrothripinae and Careinae which stridulate but have no cocoon file ; and it therefore appears likely that : (1) both groups have been evolved independently from species with non-stridulating pupae and cocoons of the general form and texture of the species which to-day have a cocoon file ; or (2) the species with the parchment-like cocoons are derived from an ancestral form having a cocoon file. In either case, the present arrangement of genera in the Sarrothripinae and Careinae is unnatural. As now constituted, the Sarrothripinae include many genera with cocoons and pupae exactly like those of the Careinae, and a few genera with a very different type of cocoon and pupa.

V. POSSIBLE FUNCTION OF SOUNDS PRODUCED.

The function of the various sounds produced by pupae is not definitely known. Several writers have claimed that they serve to startle or frighten away predators or parasites, but in no instance has the slightest proof from experiment been advanced for this assertion. Nevertheless, there are some general grounds for believing that the function of the sound may be defensive.

If it is assumed that the sounds produced have a function, an assumption for which there is no good direct evidence, the problem is what part does sound play in the life of the pupa. The behaviour pattern of the pupae is much less complex than that of the adults, and for this reason the problem of eliminating the parts of the behaviour pattern not directly related to sound production is probably less difficult. For instance, sound production in pupae can hardly have anything to do with social or sexual behaviour, as it may in some adults, because pupae apparently do not exhibit social or sexual behaviour.

The insect in the pupal stage has in large measure disrupted relations with the external physical and biological environment. The variations in its structure and colour, and cocoon if present, appear to be related primarily to two factors : defence and the method of escape of the adult. A brief consideration of the more conspicuous variations in structure and colour of pupae will suffice to show that, at least in a broad general way, these variations are related to differences in the method of escape of the adult and type of defence of the pupa. By a process of elimination it can be shown that if stridulation has a function its function is defensive.

A great many Microlepidoptera, i.e. all (?) of the Monotrysia and a very large number of the more primitive Ditrysia (e g. Tinaeidae, Cossidae, Sesiidae, Tortricidae, etc.) escape from cocoon or pupal cells while still enclosed within the pupal cuticle. The moths wriggle most of the way out before shedding the pupal cuticle, which is nearly always left with its posterior end in the cocoon or pupal cell. The pupae of these moths have, apparently without exception, rows of posteriorly directed spines on one or more of the abdominal segments. The method of escape of these moths is dependant on the presence of backwardly directed spines on the pupal cuticle. When the moth is emerging, some of the pupal spines are engaged in the cocoon fabric and provide the resistance for the forward thrust of the moth. At the same time the spines of other segments are disengaged and brought slightly forwards to secure a purchase slightly in advance of that they previously held. In this connection it is significant that the Microlepidoptera which shed their pupal cuticle entirely within the cocoon apparently never have rows of posteriorly directed spines on the abdomen of the pupa.

A further striking feature positively correlated with a particular method of escape may be mentioned. A great many Microlepidoptera and a few Macroheterocera have a sharp and hard ridge or tubercle, often known as a cocoon-cutter, on the vertex of the head. Whenever a cocoon-cutter is present it is used, in all species that have been studied, by the emerging moth to cut the silken threads which fasten together the lips of the escape valve or fasten down the operculum. Although no exceptions to this rule are known, some moths that have no cocoon-cutter use the smooth vertex of the head to break through the threads that close the escape valve.

I have previously (Hinton, 1946*b*) pointed out that so long as pupae are concealed in cocoons or cells there is little variation in their colour, which ranges from pale to very dark brown. There are a great many pupae that are not pale or dark brown, but these are either not concealed in cells or cocoons, or, if in cocoons, the walls of the cocoons consist of an open mesh-work through which the pupa may be seen. The colours and shapes of most pupae that are exposed are apparently protective in one of two ways: (1) they are such as to make the pupa unrecognizable as a pupa against its natural background; or (2) they make the pupa extremely conspicuous against its natural background, e.g. many

Danaidae and other distasteful species which have warning colours.

Although the chief variations in structure and colour of lepidopterous pupae can be shown to be related to defence and the method of escape of the adult, this is not true of all pupae. For instance, the aquatic pupae of the Diptera exhibit many notable variations in structure that are related to their method of locomotion and respiration. Owing to their freedom of movement, many aquatic dipterous pupae are able to exercise a choice as regards the temperature and oxygen tension of their environment. Their behaviour is thus more complex than that of the great majority of terrestrial pupae which, though they may wriggle, are unable to change their location and therefore unable to exercise a choice between environments of different physical attributes.

From the preceding discussion it appears that the function of sound production in lepidopterous pupae can have nothing to do with social or sexual behaviour, with the emergence of the adult, or with any slight adjustments to temperature or humidity that a small proportion of sound-producing pupae may be able to make. Since there is no evidence that the function of the sound is not defensive, and since there is no other aspect of the behaviour of pupae to which stridulation appears to be related, the function of sound production would appear to be defensive. This conclusion is supported by the fact that the pupae, as a rule, only stridulate when they are disturbed.

ACKNOWLEDGMENTS.

My best thanks are due to Mr. W. H. T. Tams, who not only lent me most of the pupae I have been able to examine but who has also been to much trouble in checking the names of the moths. I am also grateful to Brig. W. H. Evans and the late Dr. A. S. Corbet for checking the names of the Lycaenidae and Hesperiidae respectively.

APPENDIX.

Since this paper was written I have seen many other pupae, and the following species should be added to Table II: Papilionidae: *Troides amphrysus* Cram., *T. helena* L., *T. paradisea* Stgr., *T. priamus* L., *T. victoriae* Gray; Lymantriidae: *Dasychira grotei* Moore, *Lymantria ascetria* Hbn., *L. atlantica* Ramb., *L. brotea* Stoll., *L. concolor* Walk., *L. detersa* Walk., *L. dispar* L., *L. todara* Moore, *L. incerta* Walk., *L. lapidicola* H. S., *L. lunata* Stoll., *L. monacha* L.; and Saturniidae: *Actias selene* Hbn., *Holocera agomensis* Karsch, *H. suavis* Roths., *Hylesia acuta* Druce, *H.*

nigricans Berg., *Nudaurelia tyrrhea* Cram., *Polythysania edmondsii* Butl., *Urota sinope* Westw.

In addition, Mr. D. G. Sevastopoulo informs me that he has heard the pupa of *Papilio polytes* L. make a hissing noise. Many Zygaenidae produce sounds by rubbing their pupal spines against the walls of their cocoons. These pupal spines project backwards and function when the moths are emerging from their cocoons. Further work is necessary to show whether or not the sounds produced by Zygaenid pupae are merely incidental.

REFERENCES.

BELL, T. R. D. (1918–25), The Common Butterflies of the Plains of India. *J. Bombay nat. Hist. Soc.*, **25–30**.

Idem and SCOTT, F. B. (1937), *Fauna of British India. Moths.* V: *Sphingidae.* London.

FLETCHER, T. B. (1919), Second Hundred Notes on Indian Insects. *Bull. Agric. Res. Inst. Pusa,* **89**, 102 pp., 48 figs.

HEMMINGSEN, A. M. (1946), A Chrysalis Stridulating by means of Instrument on Inside of Cocoon. *Ent. Medd.*, **25** : 165–173, 5 figs.

HINTON, H. E. (1946*a*), The "Gin-traps" of some Beetle Pupae; a protective device which appears to be unknown. *Trans. R. ent. Soc., Lond.*, **97** : 473–496, 27 figs.

Idem (1946*b*), A New Classification of Insect Pupae. *Proc. Zool. Soc. Lond.*, **116** : 282–328, 64 figs.

JACKSON, T. H. E. (1937), The Early Stages of Some African Lycaenidae (Lepidoptera), with an Account of the Larval Habits. *Trans. R. ent. Soc., Lond.*, **86** : 201–238.

PIEPERS, M. C., and SNELLEN, P. C. T. (1910), *The Rhopalocera of Java: Hesperiidae.* 60 pp., 10 pls. The Hague.

PRELL, H. (1913), Über Zirpende Schmetterlingspupen. *Biol. Centralb.* **33** : 496–501, 5 figs.

SCHILD, F. G. (1877), Miscellen. Fünf Entwickelungsstände gleichzeitig.-Zirpende Insektenpuppen.-Darwinistische Erwägungen.-*Stett. ent. Zeit.*, **38** : 85–97.

TUTT, J. W. (1904), *A Natural History of the British Lepidoptera,* **4**. London.

NOTES AND OBSERVATIONS.

TRANSPLANTING OF LOCAL INSECTS.—The Committee for the Protection of British Insects of the Royal Entomological Society of London has recently had under consideration the desirability of keeping records of attempts to introduce British Insects into new habitats. It is believed that many entomologists have made experiments of this nature which are nowhere recorded, and may therefore confuse local records. The Committee has received a small number of reports already in response to the first publication of this note, but believes many other entomologists have data on this subject. It would welcome further information so that it may be filed in the Society's rooms, where it would be treated as confidential and made available only for approved investigations.—N. D. RILEY, *Honorary Secretary.*

LAMENT OF A TREACLER.

I've sugared in the forest, I've sugared in the glen,
I've sugared up on mountains, been successful now and then.
I've had *c-nigrum* by the thousand and *nupta* by the score,
Wainscots in the fenlands, rare migrants by the shore.
Fraxini fair evades me, *zollikofferi* as well,
But not for want of trying; perhaps it's scent or smell.
Cunning are my recipes, brewed with practised skill.
Pungent subtle odours waft from out the kitchen "still."
One day I made a Special Trip. I judged the time was ripe
For optimists like me to get the Lunar Double Stripe.
My luck was out however: I drove home in the rain.
Cold again the night was: all that way seemed vain.
Yet from underneath the bonnet when I cleaned my motor car
There came forth all the four wings of a Double Striped Lunar!

R. F.

ABERRATIONS OF COLIAS CROCEUS AND ARGYNNIS EUPHROSYNE.—Mr. Cruttwell's letter (*Entom.*, **81**: 163) reminds me that on October 4, 1947, whilst collecting amongst the flower beds on the front at Hove, I captured a *C. croceus* with the right side normal female, the left fore wing *pallida*, and the left rear wing about 90% normal, but with traces of *pallida* on it. Mr. Cruttwell will be interested to note that Frohawk (1934, *British Butterflies*, 335) mentions that an aberration similar to his own was taken in "the great *C. croceus* year of 1877." Ab. *pallida* was very abundant in the Brighton area last autumn, and on the day following the above capture, viz. October 5, I took over 60 in about two hours in a clover field at Rottingdean. They make a very interesting series as there is great variation in size, in the shape of the wings, and in the colour of the discoidal spot on the hind wing, which varies from deep orange to palest yellow. This abundance of ab. *pallida* was particularly noteworthy to me as I had seen and taken large numbers of *C. croceus* in Surrey from July to September that year without seeing a single ab. *helice* or *pallida* there. On May 13 of this year I had another stroke of luck and took a pale stone-coloured *A. euphrosyne* in perfect condition in a wood near Oxshot, Surrey.—J. B. PUREFOY; Upper Tilt, Cobham, Surrey.

THE SURVIVAL OF COLIAS CROCEUS FOURCROY IN WEST SOMERSET.—The last of the 1947 *croceus* were seen on November 8, when several examples of both sexes, including var. *helice*, were in perfect condition. After a mild winter a few *croceus* appeared on May 8 and on the following ten days, about 15 in all being seen or taken. At least one male had obviously just emerged, the wings being still limp. Eggs were obtained from a captured female, and 15 imagines (6 ♂, 9 ♀) emerged between June 28–July 4, after a life-cycle of 49–55 days. The first wild *croceus* was seen on July 21, and between that date and August 5 about 30 were seen, mostly worn males, but there were two perfect *helice*. A few third brood specimens, all males, appeared on September 14 (2), 17 (1) and October 2 (3). Incidentally, all these later specimens, both in 1947 and 1948, were very lethargic and seemed very unwilling to fly very far or very fast, so that it was quite easy to take them on the wing, a feat which none but the fleetest of foot would attempt in July or August !—S. J. HUTCHINGS ; Five Houses, Tonedale, Wellington, Somerset.

THE COME-BACK OF NYMPHALIS POLYCHLOROS.—During the past season the undermentioned specimens of *N. polychloros* were observed by me: Two in Ashtead Woods on April 7, one near Newbury, Berkshire, on April 21, one in Ranmore Woods, Surrey, on May 7, and a freshly emerged individual at Westcott, Dorking, on July 27. The reappearance of this species in Ranmore Woods I found particularly interesting, for it was in these woods that I took it frequently during the late 'eighties and early 'nineties, but saw it there but once since those days, that being in 1919, when I netted three as they fed on sallow bloom.—A. A. W. BUCKSTONE ; 69, Gibbon Road, Kingston-on-Thames, Surrey, October 1, 1948.

ABERRATION OF PLEBEIUS ARGUS.—While collecting on a heath in the New Forest on July 3, 1948, in company with Mr. C. Dixon, I took at rest a male Silver Studded Blue with the outer ring of spots entirely absent from both the fore and hind wings, and only two small dots remaining near the base of the latter. I understand that *obsoleta* forms as extreme as this are of very rare occurrence in this butterfly.—C. G. M. DE WORMS.

SECOND BROOD ARGYNNIS EUPHROSYNE.—On August 22, I captured here an *Argynnis euphrosyne* in perfect condition. I think that it is unusual to find this species in the second brood.—GERALD TREMEWAN ; Wheelkese Scorrier, Redruth, Cornwall, Sept. 8, 1948. [Remarkable in this season.—ED.]

ERRATIC EMERGENCE OF PAPILIO MACHAON.—At the end of July, 1947, Mr. Charles Mellows took a number of ova of *P. machaon* on the Norfolk Broads. The resultant larvae pupated in due course. One perfect insect emerged during the first week in October, 1947, the majority during the first week in June, 1948, one on August 20, 1948, and another on September 7, 1948. Two other pupae are still alive.—W. T. MELLOWS ; The Vineyard, Minster Precincts, Peterborough.

A MIGRATION OF VANESSA CARDUI L. IN THE CENTRAL MEDITERRANEAN.—In continuation of my note under this heading (1948, *Entom.*, **81** : 186) the butterflies evidently contained an unusual quantity of fat. After a bare three months the papers containing the specimens caught are soaked through and through with grease. In the past I have kept *cardui* in papers for several years before setting, both Indian specimens of my own collecting from Kashmir, the Punjab and various Himalayan hill stations, as well as specimens received from correspondents in Australia and the U.S.A., and I have never noticed any more than a very slight staining of the containing papers.—D. G. SEVASTOPULO, F.R.E.S. ; Nairobi, Kenya.

THE SPREAD OF PARARGE AEGERIA L. IN N.W. KENT.—With reference to T. G. Howarth's notes on *P. aegeria* near Sevenoaks (*Entom.*, **81** : 221) perhaps the following will be of interest. Previous to 1947 we had no records of this species in the area, but during the fine summer of that year specimens were noted in small numbers at various localities. The first were seen at Holwood Park, near Keston, when three or four in worn conditiom were observed. Further visits were paid in August and several more, all worn, were seen. Spring brood butterflies were plentiful in 1948 at this locality, and there is no doubt that it is quite well established here now. *P. aegeria* is now quite common in all suitable parts at Biggin Hill, where previous to 1947 it was unheard of. This also applies to Shoreham, and examples have frequently been seen at Eynsford. Two were recorded at Joyden's Wood, Bexley, in 1947, but none have been seen here this year. A single specimen was noted in Pett's Wood during May this year, and this would lead one to believe that the species is spreading still further into Kent.—D. F. OWEN and J. F. BURTON; 3, Lockmead Road, Lewisham, S.E. 13.

VANESSA HUNTERA FABRICIUS IN PORTUGAL.—I believe that this is the first time that *huntera* is reported from Portugal because I see no mention in the Portuguese Bibliography concerning this species. On August 14, 1948, at 3 o'clock p.m. (P.S.T.) I captured one female specimen of this butterfly on the higher parts of Sta. Cruz Beach, about 60 kilometres to the north of Lisbon. It was a sunny day without clouds, rather warm, with a moderate wind blowing from N.-N.E. It is a perfect specimen, very fresh in colour and form, and giving entirely an impression of a very recent emergence. When captured it was sucking the flowers of *Carduus* sp. It is rather difficult to understand how this specimen could be an immigrant one, being in such a fresh condition. It is just like the others I have in my collection from Brazil, and is now in the Portuguese Section of my collection.—FERNANDO MENDES; 72, Avenida da Liberdade, Lisboa.

THECLA QUERCUS AT SCUNTHORPE, LINCS.—On August I found a *Thecla quercus* in a dazed condition on the highway near a small wood in this district. This wood was mostly oak, and I could see a few more flying among the higher branches. This is the first time I have observed this species in the Scunthorpe area. Since my recorded capture here on April 19 of a *Celastrina argiolus* there has been a summer emergence of this butterfly. On August 4, two *argiolus* visited a bed of marigolds in my garden.—J. H. DUDDINGTON; 5, Normanby Road, Scunthorpe, N. Lincs.

NYMPHALIS ANTIOPA TAKEN IN COP.—Capt. Dannreuther informs me that Mr. Wright captured at Bexley, Kent, on April 11, 1948, a pair of *N. antiopa* in cop. They separated on capture. Although the female laid eggs these proved infertile. Whether these were wild or liberated specimens seems a matter of conjecture.—N. D. RILEY.

HYLOICUS PINASTRI IN SURREY.—Between July 8 and 16, 1948, I found a number of this fine insect sitting by day on the trunks of pine trees in this district. I have looked for it in vain before, and it is evident that its spread is continuing and that it is now established in West Surrey.—H. B. LAWSON; Churchmead, Pirbright, Surrey.

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A NEW SPECIES OF *CYCLARGUS* NABOKOV (LYCAENIDAE, LEPIDOPTERA).

BY V. NABOKOV.

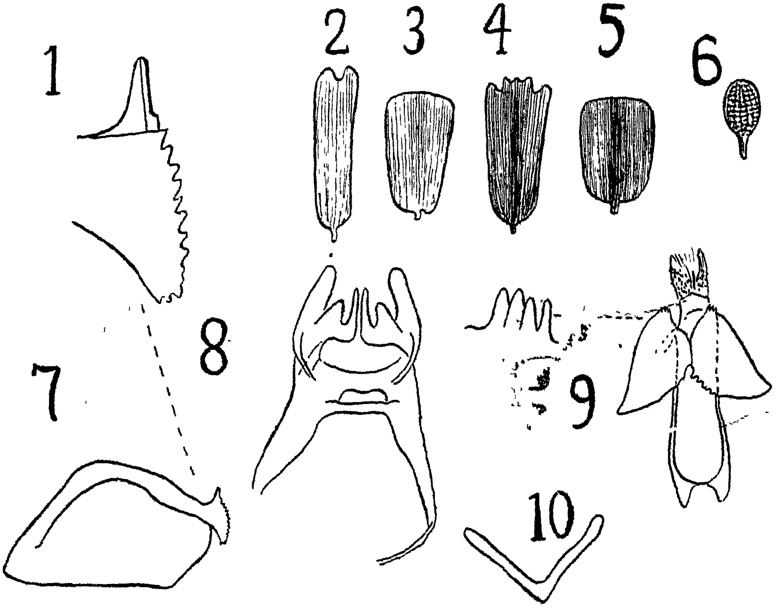
Cornell University, Ithaca, N.Y.

DR. A. S. CORBET, as quoted by Carpenter and Lewis (1943, *Ann. Carnegie Mus.*, **29** : 392), applied (wrongly) the name "*Hemiargus catilina* Fabricius" [Bethune-Baker, *nec* Fabricius] to material in the British Museum from Hispaniola [probably *Cyclargus thomasi noeli* (Comstock and Huntington)] and Nevis Island [possibly *C. woodruffi* (Comstock and Huntington)], and also to specimens, then in the Oxford University Museum, from Little Cayman (3 males) and Cayman Brac (a male and a female). Comstock and Huntington (1943, *Ann. New York Acad. Sci.*, **45** : 112) suspected that the mysterious Cayman specimens belonged to the group which I later defined generically as *Cyclargus*, and showed that Fabricius's description of *catalina* could apply only to the Floridian race of *Leptotes cassius* (Cramer) (*ibid.*, 91–92). Professor G. D. Hale Carpenter very kindly sent me from Oxford one of the Little Cayman males for study, and this I find belongs to a new (fifth) species of *Cyclargus*, genitalically intermediate between *C. thomasi* (Clench) and *woodruffi* (Comstock and Huntington). The reader is referred to my paper on the wing-pattern of the sub-family (1944 [20.ii.1945] *Psyche*, **51** : 104) and to my revision of its neotropical section (1945 [26.x.1945] *Psyche*, **52** : 1) for an explanation of the terminology used here.

Cyclargus erembis, n. sp. (Figs. 1–11).

Genitalia (male).—Aedeagus 0·8 mm. with penis 0·7, thus larger than *thomasi* and very like *woodruffi*. The sagum seems to possess only four distally placed teeth (about 0·03 long) on each lobe (0·36 by 0·2) instead of the ten or so, which can be easily made out in *thomasi*. The measurements of the uncus (forearm 0·19 by 0·03, humerulus 0·055 by 0·12, shoulder 0·14 by 0·05, lobe 0·24 by 0·06) suggest an intermediate stage between *thomasi* (ten males examined) and the only specimen of *woodruffi* I have measured (cp. *Psyche*, **52** : 18–19, and see Pl. 3, *ibid.*). The same may be said of the valve (0·7 by 0·4). The comb is slightly narrower than in *thomasi* with the first tooth conspicuously prolonged (0·06) as in the latter species but slightly thicker and on the whole shorter than in *thomasi* specimens, of the same wing-size, and with the rest of the teeth (15) distinctly smaller and blunter and thus approaching *woodruffi* where, however, they are more numerous.

Androconia.—In all *Cyclargus* this scale resembles a mandolin in shape but in the *thomasi* group its body is oval (0·045 mm. by 0·035 in *erembis*, slightly narrower in *woodruffi* and still narrower in *thomasi*) with only six visible ribs, while in the *ammon* group it is short and round (0·03 by 0·03) with eight ribs in *ammon* and ten in *dominica*.



FIGS. 1–10.—Genitalia of *Cyclargus erembis* Nabokov. (1) comb of valve; (2–5) scales; (6) androconial scale; (7) valve; (8) uncus (9) aedeagus (with teeth of sagum shown separately; (10) furca.

Wing measurements and neuration.—Fore wing length (from thorax to termen between veins R_4 and M_1) 12·5 mm. Breadth (from end of vein R_4 to end of vein 2A) 8 mm. Centre of scale lines placed at the base of the wing as in other *Cyclargus* forms (cp. *Psyche*, **52** : 31). Veins Sc and R_1 come very close to each other at 3/4 of the former and at 1/4 of the latter, near scale line 60 (a generic character). Extension of ten scale lines equal to 0·6 mm. The veins begin and end at the following scale lines (the scale-line passing through the beginning of Cu is taken as 0): Sc 2–84, R_1 48–100, R_2 65–135, R_3 83–163, R_4 129–190, M_1 83–198, M_2 92–195, M_3 82–190, Cu_1 82–186, Cu_2 52–180; 1A ends at 174, and 2A at 170.

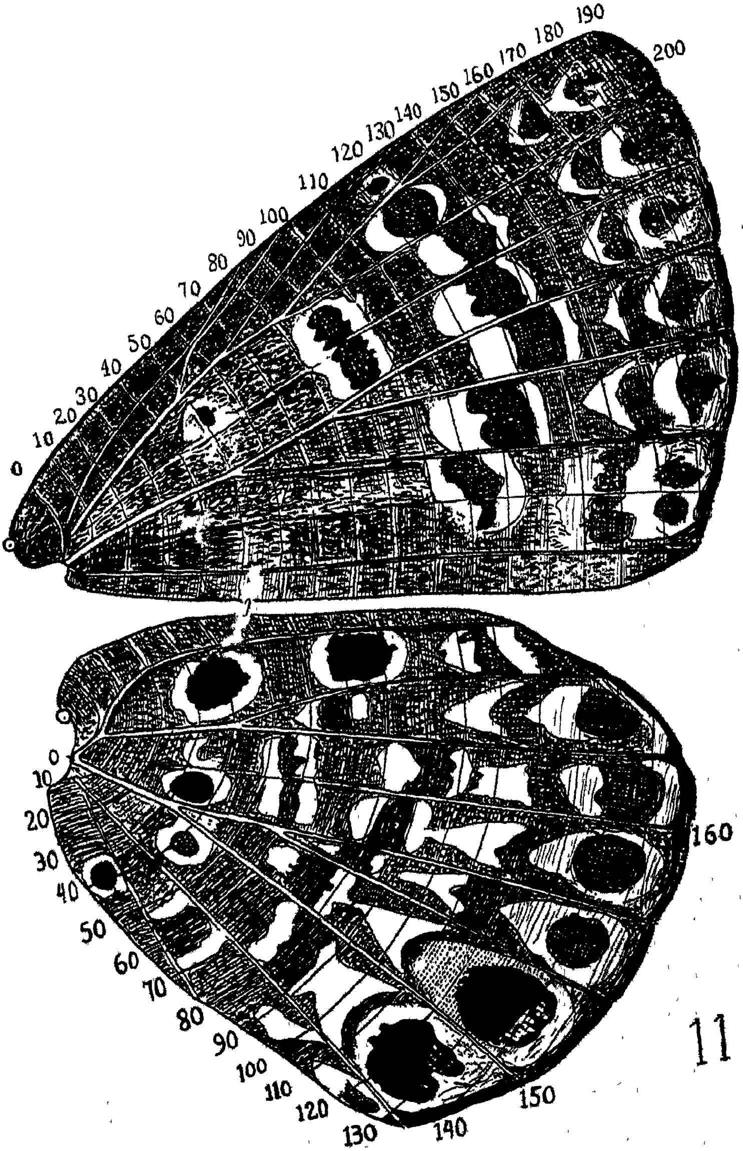


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Fig. 11.—Underside of wings of *Cyclargus erembis* Nabokov, with numbered scale-lines.

Hind wing length (from thorax to termen between veins M_1 and M_2) 10 mm. Breadth (from end of vein Sc to end of vein 2A) 8 mm. Centre of scale-lines placed at the base of the wing as in all *Plebejinae* so far studied. Limits of veins: Sc 2–116; Rs 42–140; M_1 42–158; M_2 58–160; M_3 60–159; Cu_1 60–157, Cu_2 33–150. 1A ends at 143. 2A at 135 and 4A (3A *auct.*) at 79.

Upperside.—The usual *Cyclargus* dullish ("optilete") blue overlay on a drab fuscous ground. The specimen is considerably rubbed so that an exact description is impossible. The fuscous vadum ("border") extends to about 5 scale-lines in the hind wing and slightly more in the fore wing. The hind wing praeterminal marks (Cu_1 and fused $Cu_2 + 1A$) of the underside are reproduced above as slightly smaller insulae. The fringes of both wings are almost completely gone, but what can be made out suggests very weak outer triangles (unlike the boldly checkered cilia of *ammon*). All this could just as well apply to large specimens of *thomasi bethune-bakeri.*

Underside ground.—Dull darkish fawn, with, in the fore wing, a dusting of coarse whitish scales in most of cell RM, in most of the antemacular part of cells M_3, Cu_1 and Cu_2, and also in the apices of cells R_1, R_2 and R_4.

Pigmentation of underside macules.—Three main stages of this can be distinguished.

1. Dull fawn, hardly darker than the ground, so that the macules are apprehended as such mainly on the strength of their conspicuous white rims or frames. This refers to all the semimacules of both wings (seven in fore wing, eight in hind wing), to all the corresponding praeterminal marks except the cubital and anal ones of hind wing, to IRM of hind wing and to the hind wing discal macules Rs, M_1, M_2, M_3, Cu_1, $Cu_2 + 1A$ and 2A.

2. Fawn to fuscous, distinctly darker than the ground. This refers to IRM, IIR and the eight discal macules of fore wing. The not very distinct, about 2 or 3 s.l. broad, terminal line of both wings also belongs to this category.

3. Black, i.e. full concentration of pigment in the following hind wing macules: IISc, IIISc, $IIICu_2$ (in the latter perhaps transitional to stage 2), 4A, and the hind wing praeterminal marks Cu_1, $Cu_2 + 1A$ and 2A. These cubital and anal praeterminal marks show traces of scintillae and are probably rimmed with peacock blue in fresh specimens.

White elements.—In fore wing macule IIR is generously surrounded with a somewhat blurred round halo, and under it a vague agglomeration of white scales seems to form the vestigial halo of an almost extinct IIM macule. The common halo of IR and IM is slightly fuller proximally and the two sides do not come together under the R part. In the discal series the proximal sides are considerably fuller (except in $Cu_2 + 1A$) than the distal ones and, except in the case of the two well-rounded radial macules (where the two sides of the halo are crescentic and tend to meet), the half haloes are roughly bar-like and do not unite. The inner cretules (proximal half-haloes of series I) are short, and more or less V-shaped, except in the case of the blurred bar-like rims of Cu_2 and 1A. The outer cretules (distal half-haloes of series I) are distinct in the cubito-anal cells but then gradually become very diffuse costad. As is characteristic of the catochrysopoid pattern of the genus, the intervals are conspicuously white and look like crescentic false half-haloes rimming proximally the praeterminal marks and uniting with the true distal half-haloes (outer cretules), so that each praeterminal mark is more or less encircled (especially distinctly so in the lower cells) with white, while the semimacule has to content itself with merely a white proximal rim (inner cretule).

In the hind wing it is macule IIM which is strong and roundly haloed, whereas a vestigial halo replaces IIR. The sides of the IR and IM common halo are bar-like. The haloes of macules ScIII, ScII, Cu_2III and 4A are of the normal, evenly round shape in correspondence with the strong, round macules they encircle. The unconnected sides of the haloes rimming the very weak discal macules from Rs to 2A are very irregular, lumpy, more or less bar-like on the whole, and of equal extension except in the case of M_1 where the proximal side is distinctly fuller than the distal one. As in the fore wing, the fused macules Cu_2 + 1A have a common frame. The inner cretules are narrow (their bases not filling the breadth of the cell), distinctly (Rs, M_2, M_3, Cu_1) or roughly sagittate, and long enough to thinly fuse with the distal sides of the discal haloes in cells M_2 and Cu_1. This fusion is broad in Cu_2 + 1A where the inner cretules of the fused macular parts Cu_2 and 1A are fused too. The catochrysopoid character of white interval + outer cretule is especially striking in cells M_2, M_3, Cu_2 + 1A and 2A where the praeterminal mark is completely encircled with white. The auroral element is restricted to Cu_1. Interval Cu_2 + 1A is crescentic. Intervals Rs, M_2, M_3 (all three distinctly sagittate) and Sc, M_1, 2A (these three roughly sagittate—almost bar-like in the first) conform to the shape of their inner cretules.

Disposition of underside markings.—As I have shown in two previous papers the disposition of wing-markings can be mapped with the aid of their scale-line limits at points running distad along the middle part (interneural fold or groove) of each cell. Below, in the columns of figures referring to the discoidal (II and IRM), basal (anal macule and III series) and discal macules (lateral macule and II series) and their haloes, the first two figures in each set give the limits of the proximal half of the halo and the last two the limits of its distal half. Consequently the two middle figures of each set give the limits of the macule proper. In the column referring to the limbal macules (I series), each of which is split into semimacule and praeterminal mark and is bounded by cretules (the halves of the initial halo), the figures give the limits of the following sequence of components: inner cretule—semimacule—interval—praeterminal mark—outer cretule (if any).

Fore Wing.

Cells.	*Second discoidal.*	*First discoidal.*
R	43–50–53–56	81–86–95–100
M	..	83–88–97–101

	Lateral.	
Rz	117–121–127–130	..

	Second series.	*First series.*
R_4	112–118–132–135	157–160–168–175–187
M_1	120–129–141–145	159–164–172–178–185
M_2	114–128–139–143	156–163–169–173–190
M_3	119–131–144–148	154–159–165–169–184–186
Cu_1	103–119–130–134	144–152–162–168–182–183
Cu_2	100–104–119–124	135–146–151–159–172–173
1A	108–111–115–120	134–138–153–158–166–169

Hind Wing.

Cells.		*Second discoidal.*	*First discoidal.*
R	..	27–32–35–38	48–52–60–63
M	..	25–28–38–42	51–56–60–66

		Anal.	
4A	..	33–35–42–45	..

	Third series.	*Second series.*	*First series.*
Sc	23–27–45–49	61–66–85–87	96–104–111–120
Rs	..	55–62–71–75	94–106–115–129–146–155
M_1	..	77–90–97–103	105–118–127–137–153–158
M_2	..	75–81–89–95	95–114–122–133–152–157
M_3	..	67–75–84–87	92–105–120–134–151–155
Cu_1	..	61–68–79–86	86–103–107–121–145–152
Cu_2	33–37–45–48	71–78–87–92	92–105–110–115–135–143
1A	..	74–80–88–93	93–105–110–115–135–138
2A	..	51–55–66–71	88– 99–107–120–128 131

Relative position and shape of macules.—In fore wing the small round macule IIR is placed under the forking of veins R and R_1. The two (upper and lower) macules which are fused to form the first discoidal (IRM) have a jagged outline especially so on the inside. In the discal series macule R_4 is placed directly under the small R_2 and both are round. The three medial ones, especially the upper and lower, are shifted distad and form together an oblique bar bent in slightly about the middle. These and the cubital ones, which in relation to the lower medial are set *en escalier* proximad, incline to a roughly quadrangular shape with a sinuous (especially so in M_3 and Cu_1) proximal edge. The whole arrangement of the seven macules forms a weak arc, with macule Cu_1 well outside the radianal slant (*Psyche*, **51** : 133). The semimacules are intermediate in shape between a crescent and a bar. Those in Cu_2 and 1A are almost fused. The praeterminal marks are roughly rhomboid. They are quite separate and roundish in Cu_2 and 1A.

In the hind wing the strong macules 4A, Cu_2III, IIM, SCIII and ScII are well rounded and the two last are set closer together than is usual in *Cyclargus*; the rest are irregular in shape, but roughly quadrangular on the whole. In the discal series, Rs, Cu_1 and 2A are not distal enough to participate in the arc formed by the other four. The semimacules in Sc, Rs, M_1, M_2, M_3 and 2A are somewhat misshapen, with a tendency to a sagittate form; on the other hand each of the two cubital semimacules (Cu_1 and the completely fused $Cu_2 + 1A$) is a thin even arch. The extensive crescentic Cu_1 interval is completely filled with an orange-yellow aurora, the cusps of which reach scale-line 140, on both (anterior and posterior) sides of the praeterminal mark. The latter is quite round in M_2 and M_3, roundish in Rs, M_1 and Cu_1, roughly heart-shaped (pointing basad) in $Cu_2 + 1A$, where the two marks are almost completely fused, and wedge-shaped in Sc and 2A.

Material.—One male, holotype, "Little Cayman Isl., West end of S.W. Point area, 29.v.1938 [*leg.*] C. B. Lewis and G. H. Thompson, Oxford Univ. Cayman Is. Biological Exp.", British Museum (Nat. Hist.).

Comparison with allied species.—The presence of macule IIR or second upper discoidal, counting basad, in fore wing, not represented in any other *Cyclargus*, but of common occurrence in the sub-family and family, distinguishes *erembis* from all its congeners. It differs from them further in the following underside characters:

from *ammon* Lucas and *dominica* Moeschler in a lesser development of cretules and other white elements (there are other distinctions, e.g. the absence of macule Cu_2III in *ammon*, no less obvious);

from *thomasi* races in a slightly longer aurora;

from *thomasi thomasi* Clench (to which it is very similar in darkish ground colour, pigmentation of macules and shape of cretules and halos) and *thomasi noeli* Comstock and Huntington (which is of a much whiter fawn) in larger size;

from *thomasi bethune-bakeri* Comstock and Huntington in the lesser development of cretules (in length and breadth), which in the latter race form band-like fusions in both wings;

and from *woodruffi* Comstock and Huntington (a very poor specimen for comparison) in a paler, slightly smaller aurora, narrower cretules and darker general appearance.

Conclusions.—I am inclined to think that the known *Cyclargus* forms fall into two genitalically very distinct superspecies, the *ammon* group and the *thomasi* group, the former consisting of two (*ammon* and *dominica*) and the latter of three (*thomasi*, *woodruffi* and *erembis*) genitalically less differentiated species, one of which (*thomasi*), moreover, consists of at least three genitalically identical subspecies (*thomasi*, *noeli*, *bethune-bakeri*).

These relationships are also borne out by the androconia and the pattern.

There is little doubt in my mind that *erembis* will be found to occur (sympatrically with *ammon*) on Cuba—that, in fact, it is the Cuban representative of the *thomasi* group.

CRYPHIA MURALIS IN HERTS.—A *C. muralis* (Marbled Green) flew into my bedroom at Royston on August 1, and was in fine condition. Although Royston is just near the Cambridgeshire border, where this species occurs, it nevertheless is a Hertfordshire record.—E. E. JOHNSON; Brighton Hall Hotel, Cartwright Gardens, W.C.1.

XANTHORHOË FLUCTUATA AB.—On September 14, 1947, a melanic variety of this species was taken in my house attracted by light. It is very similar to the specimen figured on Plate 80, fig. 14, in South's *Moths*, and as it does not appear to have been noticed in this county before, may be worth recording.—C. GRANVILLE CLUTTERBUCK, F.R.E.S.; 23, Heathville Road, Gloucester, November 5, 1947.

CERASTIS RUBRICOSA AND ORTHOSIA INCERTA: UNUSUAL FOOD-PLANTS.—Although many Agrotid larvae are credited with a catholic choice of food-plant, it may be of interest to record the discovery of a half grown larva of *Cerastis rubricosa* feeding on the flowers of *Listera ovata* on the South Downs on June 12. The same day a tiny larva of *Orthosia incerta* was noted on the leaves of *Cephalanthera grandiflora*. Both larvae fed up well in captivity on flowers of *Orchis maculata*.—G. HAGGETT; 1, Torton Hill, Arundel, Sussex.

CAMPONOTUS HERCULEANUS IN NORFOLK.—Whilst spending a week-end at Cromer, during June, my father mentioned that he had seen some large black ants among imported German timber at the saw mill. On showing some later to Mr. E. A. Ellis of the Norwich Museum, he identified them as *Camponotus herculeanus* L. The last occasion that this species was taken in Norfolk was 1876, when they were found in some American timber in Frazer's Saw Yards in Norwich; these specimens are still in the Bridgeman Collection housed in the Museum. Donisthorpe (*British Ants*) mentions them as visitors and gives a few authentic records, the Norwich ones being the first known occurrence in this country. The workers measure 11 mm., the winged queens 15 mm., with a wing span of 35 mm. As these appeared to be in fair numbers, there may be a possibility of their establishing themselves in the woods in the district.—K. E. DURRANT; The Hollies, Theatre Street, E. Dereham, Norfolk.

A NOTE ON THE GENUS *MERMA* WEISE, WITH A DESCRIPTION OF A NEW SPECIES (COLEOPTERA, COCCINELLIDAE).

By A. P. Kapur, Ph.D.

The genus *Merma* Weise (1898) was proposed to include two species, *Merma limbata* Weise and *Merma spilota* Weise, from the Cameroons, West Africa. Weise provisionally placed this genus close to the phytophagous genus *Solanophila* Weise because of the similarity in the position of the antennae, shape of the eyes, structure of the legs and double punctation of the elytra. He was, however, unable to examine its mandibles, and was therefore uncertain as to its exact position. He further observed that one of the above-mentioned species superficially resembled the genus *Exochomus* Redtenbacher or *Chilocorus* Leach and the other a strongly convex *Bucolus* Mulsant, but that neither was otherwise related to these genera. In 1931, Korschefsky fixed *Merma limbata* Weise as the type of the genus. Recently, Mr. W. V. Harris sent from Uganda, East Africa, the immature stages and adults of what appears to be an undescribed species of this genus. Since the larvae are being described elsewhere, together with larvae of other species of Epilachninae, the author takes this opportunity of describing the adults and providing a key for the separation of the adults of the known species.

Diagnostic Characters of the Genus.

Body subrounded, moderately convex, pubescent; last segment of maxillary palpus securiform; eyes only very slightly emarginate, glabrous; clypeus widely emarginate anteriorly and emarginate on either side round base of antenna; pronotum with the lateral margins subrounded, and not angular posteriorly; scutellum triangular; elytra sparsely punctate and closely punctulate, shoulders rounded, shoulder boil nearly obsolete; epipleurae wide, hollow and inclined; dorsal surface of anterior tibiae with a channel; claws (Fig. 2, C) bifid, without a basal tooth; abdominal lines subrounded, incomplete; the fifth abdominal sternite moderately large, subrounded posteriorly in the female, widely emarginate in the male; the sixth sternite short and not split in the middle in either sex.

Key to the Species.

1. Body bright reddish testaceous; external margin of elytra bordered black . . . . *limbata* Ws.
   Body fuscous; elytra fuscous, each with either a large, oval, testaceous, discal area or a smaller reddish testaceous, subapical spot 2

2. Antennae and mouth-parts yellowish; elytron fuscous with a smaller, reddish testaceous, subapical spot . *spilota* Ws.
Antennae and mouth-parts fuscous; elytron with a large oval, testaceous discal area surrounded by a rather narrow, fuscous border along the median, basal and external margins (Fig. 1) . . . . *mediata* sp. n.

Merma mediata sp. n. (Figs. 1, 2).

Body (Fig. 1) subrounded; dorsal surface moderately convex, with short, rather dense, greyish pubescence; head, antennae and mouth-parts fuscous, eyes black; pronotum fuscous with the lateral parts paler; scutellum fuscous; elytron with narrow, fuscous borders on the median (sutural), basal and external margins and with the large discal area testaceous; underside with the legs testaceous, and the remaining parts light fuscous to testaceous.

Head (including eyes) nearly twice as wide as long, uniformly and closely punctulate; clypeus widely emarginate anteriorly with the anterolateral angles acute; eyes large, only slightly emarginate near base of antenna, finely faceted and glabrous; antenna (Fig. 2, A) slightly shorter than the width of the head, with long sensory setae all over, eleven-segmented; first segment large, second equal to about half the length of first, third narrower but nearly as long as second, fourth to eighth short and equal to one another (except the eighth, which is slightly wider distally), ninth to eleventh forming a loose club, the ninth and tenth slightly produced and rounded on inner margins, eleventh slightly larger and subrounded distally; mouth-parts with labrum three times as wide as long, sclerotized near base, and thin and membranous distally; mandibles, like those of the typical herbivorous species, without basal teeth, each with four large and two short teeth, the former acute and sharply denticulate on inner margin; prostheca well developed; maxillae with galeae and laciniae subrounded and subtriangular, respectively, both with long, dense setae, maxillary palpi securiform and relatively compact; labium with mentum conical anteriorly, labial palpi narrow and moderately long, submentum broad and trapezoidal. Pronotum moderately convex, rounded at base except for a small median part opposite scutellum; lateral margins rounded and not forming an angle with basal or anterior margin, the latter deeply emarginate; punctulation and pubescence like that on the head; scutellum triangular, with the sides nearly equal to the base, and punctulation and pubescence as on pronotum; elytra with shoulder angles obtusely rounded, faintly bordered on external margin, closely punctulate and with small, rather shallow, sparsely dispersed punctures. Underside with moderately fine and sparse punctures and with short, rather sparse and yellowish pubescence; epipleurae of elytra deeply inclined, broad, and gradually narrowing posteriorly; abdominal lines on first segment subrounded before reaching nearly

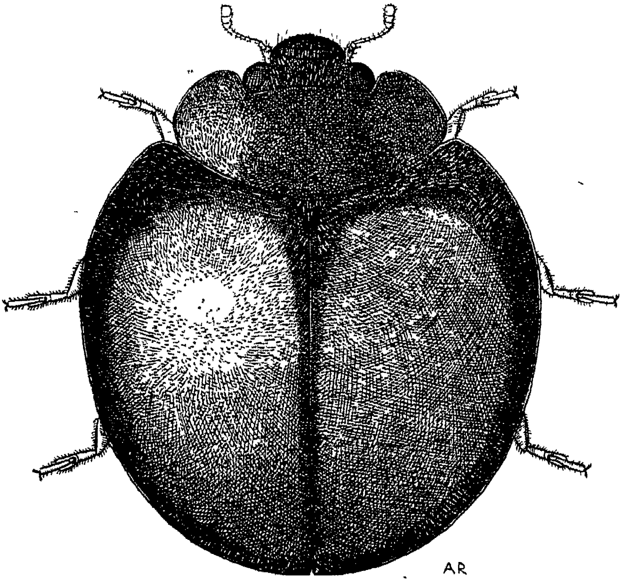

FIG. 1.—*Merma mediata* sp. n.

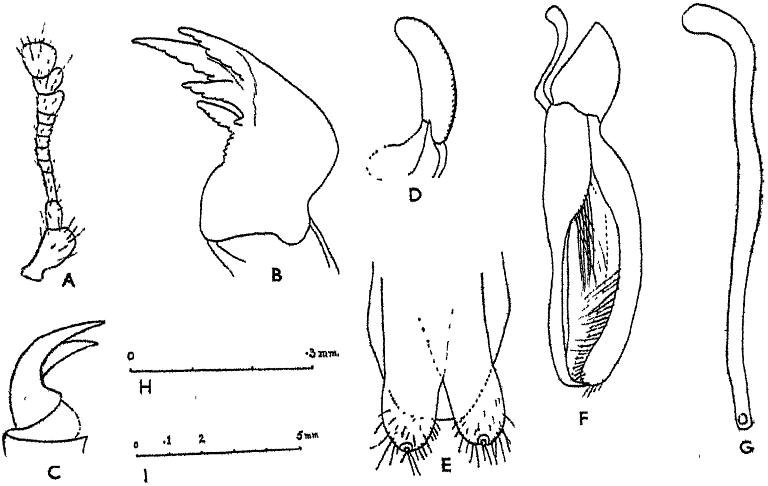

FIG. 2.—*Merma mediata* sp. n. A, antenna; B, mandible; C, claw; D, spermatheca; E, ninth sternite and tenth tergite of female; F, G, male genitalia; H, 0·3 mm. scale applicable to B and D; I, 0·5 mm. scale applicable to A, E, F and G.

to its posterior margin, running parallel to the latter for a short distance and terminating without reaching lateral margin; second to fourth sternites short and of equal length, fifth nearly twice as long in the middle as fourth, and subrounded posteriorly in female and widely emarginate in male, sixth short and complete in both sexes; in the female the two halves of the ninth sternite (E) elongate, each with the distal part bearing several long setae and a stylus at apex, tenth tergite (E) subquadrate. Spermathecal capsule (D) small, sausage-like and slightly narrowed at base. Male genitalia as shown in Fig. 2 (F); noteworthy features are the rather straight sipho (G), the cluster of long setae at the base of the penis and the right-angled bend before its pointed apex, but since the male genitalia of other species of the genus are not known, the characters that distinguish the various species of the genus cannot be assessed. Female: length 5·0 mm., width 4·8 mm.; male slightly smaller.

Type.—A female, in the British Museum (Natural History), from East Africa, Uganda, Kawanda, 21.iii.1947 (*W. V. Harris*).

Paratypes.—One male and two females also in the British Museum, and with the same data as the type (some of these specimens are somewhat teneral and are, therefore, abnormally pale in the fuscous areas).

REMARKS.

The only other species of *Merma* present in the British Museum is a female example of *M. limbata* Weise from Old Calabar, West Africa; its genitalia differ from those of *mediata* principally in that the two halves of the ninth sternite are moderately long, but broad distally, and the tenth tergite is broad and subrounded.

REFERENCES.

WEISE, J. (1898), *Deutsch. ent. Z.*, 1898, 128.

KORSCHEFSKY, R. (1931), Coccinellidae I. *In* Junk, *Coleopterorum Catalogus*, **16**, pars 118: 1–224.

COENAGRION SCITULUM (RAMBUR): THIRD YEAR OF APPEARANCE.—I was fortunately able to secure a male and female of this species at its known locality on May 22, 1948, but I am not convinced that this is the headquarters of the species, for a thorough search failed to produce further specimens. The male still bore traces of the teneral violet, but the female had assumed the adult colouring. As previous captures have been June 21 (1947) and July 21 (1946), this earlier date now gives its occurrence time in this country as at least 8 weeks.—C. O. HAMMOND, F.R.E.S.; 34, Passmore Gardens, New Southgate, N.11.

NOTES AND OBSERVATIONS.

PAUCITY OF BUTTERFLIES IN 1948.—The observations of Mr. G. E. Hyde on this subject are interesting (October, 1948, **81**). My own experience from observations locally has been similar in some respects, but with notable differences in that scarcity has not been general to all species. The spring started promisingly, and before April was out *Pararge aegeria* was common in the woods. It became very common in May and was present continuously until the autumn, although the later broods were far less numerous. *Nymphalis io* and *Aglais urticae* were numerous in early spring, and the quantity of larvae on almost every patch of nettles gave promise of abundance in the summer. This was only partially realized, as numbers diminished rapidly during July and August, and the former was not seen at all after the end of August, although my one small bush of Buddleia sported ten or more at a time on fine days early in the month. A noticeable feature of *A. urticae* was the mingling of worn and fresh specimens together from the end of May to nearly the end of June. The absence of *Vanessa atalanta* and *V. cardui* was very noticeable, and I only saw two of the former and one of the latter (in June) during the year. A solitary female *Colias croceus* was seen, and this again was in June. Other butterflies at least in normal quantities in the spring were *Gonepteryx rhamni*, *Callophrys rubi*, *Lycaena phlaeas* and *Polyommatus icarus*. The last two were, however, much scarcer in the summer months. The butterfly most noticeably abundant was *Maniola jurtina*, and this continued so throughout the summer and until well into September, with odd specimens in October. It was very attracted by the blossoms of privet, and so many were collected round some bushes that when disturbed they looked like brown leaves floating about. Going from abundance to scarcity I do not recall seeing *M. tithonus* at all, and *Pararge megera* was not as common as usual. In contrast *M. tithonus* was very common in North Cornwall in July when I was on holiday. One or two *Polygonia c-album* were seen in August and September, and I was pleased to see one on my Buddleia. In general the season started very well, but deteriorated badly from the end of June. There seems no doubt that the wet weather was the main if not the only cause. I have heard the view expressed that the severe winter of 1946/47, by killing off a number of birds, was a considerable factor in explaining the relative abundance of insects during 1947, and so no doubt in the early months of 1948. I do not know if this theory is generally accepted by entomologists, but it is certainly an interesting one.—A. H. OWEN; 169, Chaldon Way, Coulsdon, Surrey.

COENONYMPHA TULLIA IN LINCOLNSHIRE.—Mr. Blackie need not reject the Lincolnshire record because he cannot find Glandford on the map. I have a 17th century map, in which Brigg appears as Glamford brigges. Other versions of the name are Glandford-Bridge (*Gazeteer*, 1856), and Glanford Brigg (Longman's *Gazeteer* and Bartholomew's *Atlas*). Morris gives "near Glandford Brigg," not "near Glandford, Brigg," and I have no doubt he was using the old name for Brigg. As Mr. Blackie says, there are places north of Brigg which might have been suitable, and it is not far from the East Riding localities. It is therefore not improbable that the range of *tullia* formerly extended into Lincolnshire.—E. A. COCKAYNE; 8, High Street, Tring.

TWO GEOMETRID MOTHS NEW TO THE ISLE OF RHUM.—On June 10, as I was beating alder and birch in the Kinloch woods on the Isle of Rhum, I obtained a few larvae of *Plemyria bicolorata* Hufn. from the first-named tree, whilst on August 8, a rather late date, I captured a female *Venusia cambrica* Curt. at rest on a mountain ash trunk. Although both of these species have been taken in the Isle of Raasay on previous occasions, their detection in Rhum is of considerable zoogeographical importance, inasmuch as Raasay links up with the mainland in its zoogeographical affinities, and Rhum, to a certain extent, with the Outer Isles.—J. W. HESLOP HARRISON; King's College (University of Durham), Newcastle-upon-Tyne.

THE FLOWERS FREQUENTED BY COENONYMPHA TULLIA VAR. SCOTICA.—This butterfly is not often seen at flowers. Nevertheless, this June, its abundance on Rhum gave me an opportunity for noting some of its feeding habits. On June 11 it was observed in Kinloch Glen, Rhum, at the flowers of the Lousewort (*Pedicularis sylvatica*) and of Tormentil (*Tormentilla erecta*). On the 14th it was captured on the lower slopes of Mullach Mor at the flowers of the White Clover (*Trifolium repens*) and of the Daisy (*Bellis perennis*), and on June 15, on the lawn in front of Kinloch Castle, at the Creeping Buttercup (*Ranunculus repens*). Curiously enough, on the Isle of Lewis the species was never seen at flowers.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

VESPA SYLVESTRIS SCOP. IN THE ISLE OF LEWIS.—Wasps are very rarely met with in the Outer Hebrides, records from the Isle of Barra representing all that is known of their presence there. However, on June 21 a nest, about the size of a cricket ball, produced by *V. sylvestris*, was discovered attached to the upper part of a window in the Lewis Castle, Stornoway. Very soon after we discovered it, it was destroyed by small boys. Later, wasps, almost certainly belonging to the same species, were observed two miles away in the more open woodlands to the south.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

LIVIA JUNCORUM LATR. GALLING JUNCUS GERARDI LOIS.—This season, since the discovery that Hebridean examples of this Psyllid are racially separable from ordinary British specimens, a strong effort has been made to ascertain as fully as possible the various rush species favoured by the insect in the Western Isles. Behind the sand dunes at Barvas, Isle of Lewis, on the barer and harder patches of sand, where *Juncus Gerardi* flourished, it provided the Livia galls in small quantities. This rush is a very unusual substrate for the insect.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

LEPIDOPTEROUS OVA DEPOSITED ON BARE ROCK FACES.—On June 13, as a search was being made for imagines of *Apatele euphorbiae* var. *myricae* on Mulloch Mor, Isle of Rhum, three batches of lepidopterous ova were detected lying fully exposed on the Torridonian Sandstone outcrops. Two of these masses proved to be eggs of the Drinker Moth (*Philudoria potatoria*), and the third those of the Emperor Moth (*Saturnia pavonia*). Several cocoons of the first-named species were also discovered in similar positions on the same rocks.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

THE CHAFFINCH TAKING LARGER LEPIDOPTERA.—Like myself and the bats, chaffinches have discovered that the veranda of the Castle on Rhum provides an excellent position for the capture of insects. On June 19, 1947, a male chaffinch was observed to capture and fly off with a female specimen of *Laothoë populi*. This proved too heavy for the bird, and both, in consequence, fell to the ground, the moth, in the end, making its escape. This year, on June 14, a chaffinch was noticed carrying off a male example of *Philudoria potatoria*. The fate of the moth was not seen, but its weight did not seem to impede the flight of the bird.—J. W. HESLOP HARRISON; King's College, Newcastle-upon-Tyne.

AN UNUSUAL CARTEROCEPHALUS PALAEMON.—Extreme variation is rare in all the skippers, and that is why an unusual example of *C. palaemon* I caught near Peterborough in May, 1948 is especially interesting. The insect is a male with both fore wings of a deep sooty-brown colour, entirely devoid of spots. The hind wings are marked in the usual way, except that the spots are rather pale, and fortunately the specimen is in first-class condition. *C. palaemon* was flying in reasonable numbers at the time, along with the commoner skippers of the season, and this one was caught in company with a male *Pyrgus malvae* on a bugle flower. Although I have examined many chequered skippers in the past, this is the first extreme variety ever noticed by me, and I would be interested to hear of any others that may have been taken.—GEORGE E. HYDE, F.R.E.S.

CUCULLIA ABSINTHII IN BIRMINGHAM.—*Cucullia absinthii* (Wormwood Shark) has turned up here this year and is breeding in large numbers. I found 92 larvae to-day in our works car park, and it is apparently all over the city and district. It appears to have occurred at Walsall for about three years, but no doubt has been here longer, for it to be in such large numbers. This species has always been considered as being confined to Devon and Cornwall and South Wales. —H. E. HAMMOND; 16, Elton Grove, Birmingham, 27.

LEUCANIA L-ALBUM IN THE ISLE OF WIGHT.—On October 1, 1948, at Freshwater Bay, Isle of Wight, I took a single specimen of *Leucania l-album* at light at 12.45 a.m. Dr. Blair kindly ascertained for me that the only previous records for this insect in the island are one for 1900 and another in an old collection with no data other than the I. of W. as the place of capture.—A. WALKER; Highfield House, Cheddar, Somerset.

OBITUARY.

ARTHUR ROBINSON.

ARTHUR ROBINSON, B.A., died on April 9, 1948, at Scone, Perthshire, in his 83rd year. The son of a north country landowner, he was educated at Cheltenham and Jesus College, Cambridge, and was subsequently called to the Bar. He had chambers in the Temple, but practised chiefly on the Northern Circuit. A famous rugby footballer in his day, he played for the University and for England. One of the older generation of entomologists, Robinson was contemporary with E. A. Bowles, G. Bird, T. Maddison and Eustace Bankes. He was a member of the Cambridge Natural History Society. One of his earlier captures was that of a specimen of *Plusia interrogationis* in the grounds of Jesus College, and he was one of the first to breed *Plusia moneta* and *Euplagia quadripunctata*. In company with Bowles and Bird he followed closely after Wheeler in visiting the Norfolk Broads, and was one of the first to get pupae of *Nonagria algae* in that area; subsequently he paid many visits to the Broads with Bowles and the writer, and helped in the discovery of the larvae of *Nonagria dissoluta* and *Arenostola brevilinea*. Robinson was one of the first to take pupae of *Aegeria spheciformis* in mid-Sussex and was successful in assembling the males to a virgin female. He also took *Cerura bicuspis* and *Cucullia gnaphalii* in the same area. He collected assiduously in Hunts, Dorset, Devon and Cornwall, taking many local insects. The writer joined him in many expeditions to Fenland, looking for little pieces of undrained fen, where it was hoped that some of the presumably extinct insects might still have survived. Robinson put in many lonely nights at Wood Walton Fen for some years running at the end of May and early June, and his research greatly assisted in solving the life-history of *Hydrillula palustris*. After many disappointments he succeeded in breeding imagines. He experimented with all kinds of light—paraffin, acetylene, petrol lamps and an electric lamp run off his car battery—but probably his acetylene flare was the most successful. He had a gigantic acetylene generator on the Norfolk Broads which no one but he could have pulled across the fen. In his earlier days he recorded many of his observations, and sent Tutt others for inclusion in "Practical Hints." Quite late in life he visited the Shetlands and took *Apamea exulis*. When his house at Sheringham was requisitioned during the war he spent most of his time at Scone, Perthshire, with his elder daughter, who did everything she could to encourage his hobby and joined in his expeditions, enabling him to add *Zygaena achilleae* and *Apamea assimilis* and other interesting Scotch insects to his list of captures. Robinson was a Fellow of the Royal Entomological Society of London from 1889–1898 and from 1925–1948. He was greatly interested in the preservation of Wicken Fen, and served for many years on the Local Committee of Management. His collection is being presented to the Liverpool Museum, where it will no doubt be useful in replacing those destroyed during the war.—H. M. EDELSTEN.

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